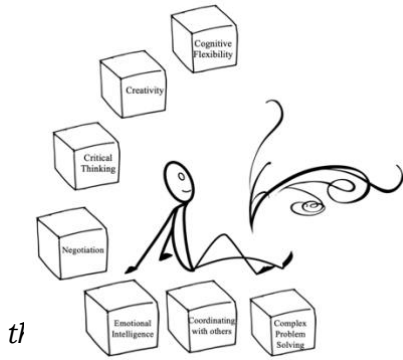


# Scaffolding Any Subject with Puzzles (Primary)

**Donna Lee Fields, Ph.D.**



One of the greatest challenges we have as teachers is to present new information that doesn't create cognitive overload. Many times, we ask our students to learn a large amount of information that is difficult for them to assimilate - either because of the content, an incompatible learning style, or because of insufficient time for them to work on it thoroughly.

In these circumstances, mental resources become stretched and the ability to assimilate the required material is reduced.\* Experts affirm that we can learn no more than seven (7) elements at a time. If you think about how much information our students are exposed to daily, we'd be more compassionate in what we demand of them in our lessons and possibly introduce new knowledge in more varied ways so as to honour the learning styles of a larger percent of them.

Using interactive scaffolding techniques such as puzzles helps to reduce the stress on mental resources by creating a problem-solving activity that combines multi-sensory foci. The action of putting them together calls on many different learning styles. Aside from being entertaining, puzzles create opportunities for students to practice motor and cognitive skills that might otherwise be ignored after the first years of Primary school.

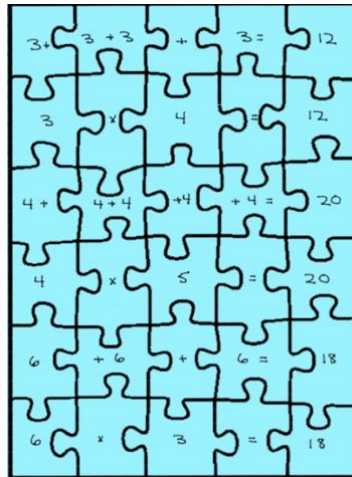
The beneficial part of this particular type of puzzle is that they can be used for any subject. You'll see below how teachers of mathematics, history, art, music, science, can all take advantage of the same template, to engage their students and let them learn autonomously. You'll see how easy it is to adapt the activity to your needs.

## **Step by step:**

1. Choose a puzzle template that has repetitive pattern pieces (the objective being for your students to solve the puzzle based on the information placed in the puzzle and not by the shape of the pieces.)

\* Hattie, John (2015). *Visible Learning and the Science of How We Learn*. Routledge Press

- Write or type the information onto the puzzle template. (In the example below, a mathematics teacher has created a puzzle that presents addition and multiplication. As students put the puzzle together, they might slowly understand that multiplication is simply a shortcut of adding numbers together.\*)



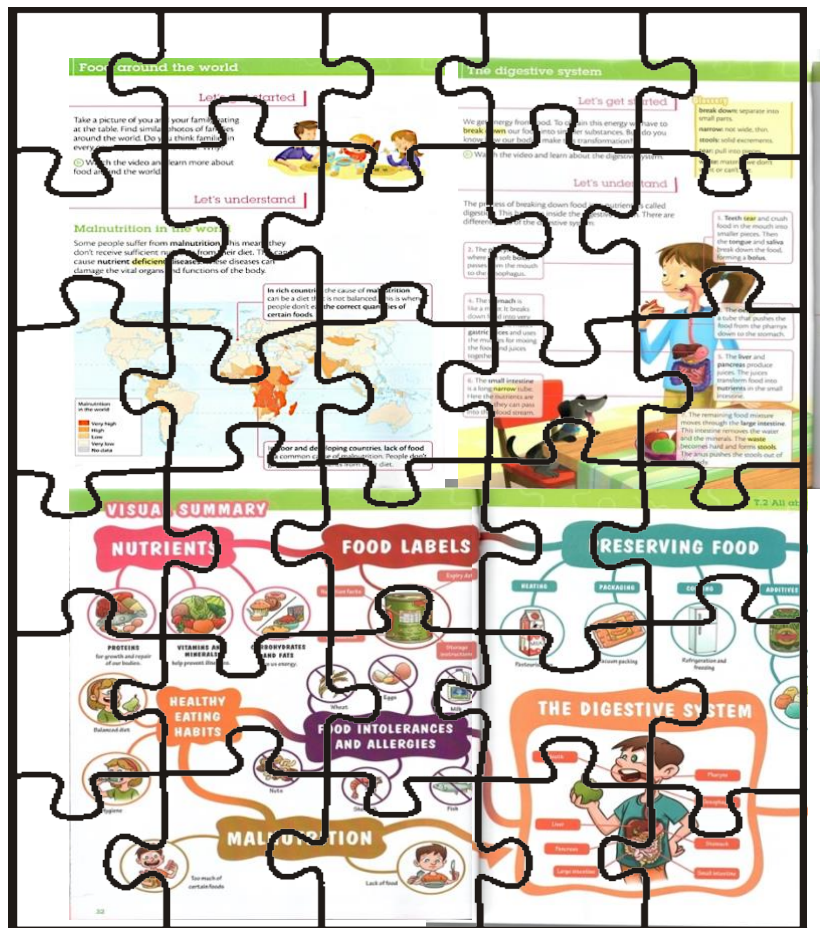
- Make one copy of the puzzle for each pair of students
- Cut them up, and hand them out. (You'll see in the [video explanation](#) of the scaffold, cutting the puzzles is much easier than you may think. If you print out the information on different colours of paper, you can cut up to six at a time, so that you can separate them easily afterwards, and so reducing the bulk of your work.)
- Note:* Speak as little as possible before students begin the activity. Write out instructions and avoid giving away the core of the puzzle (which is, in this case, the correlation between adding and multiplication).

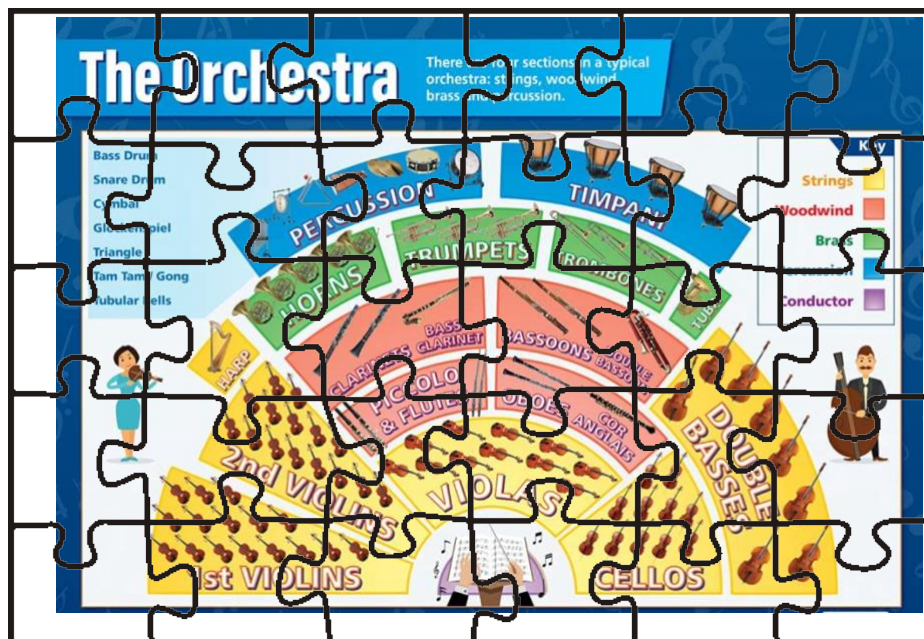
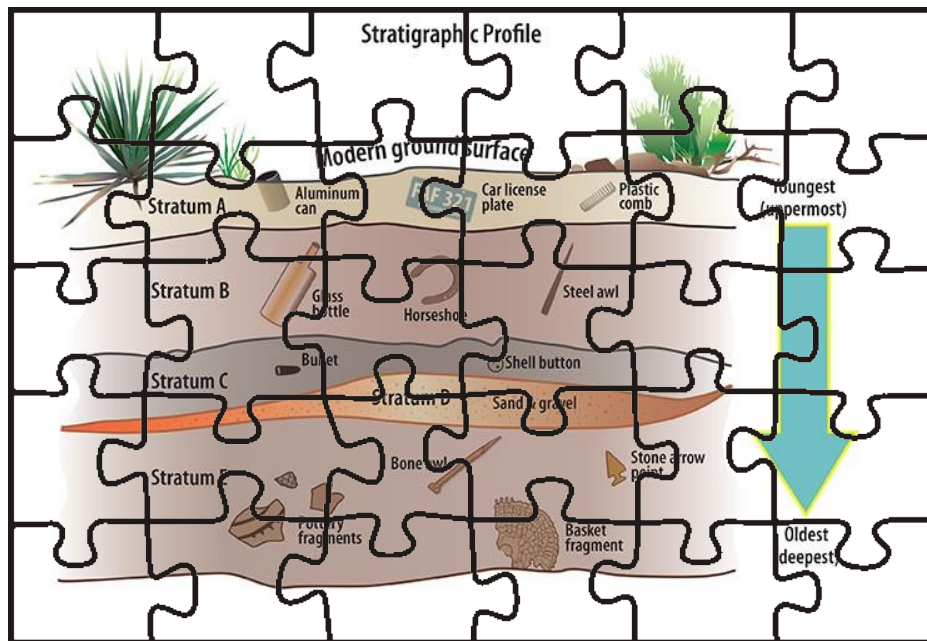
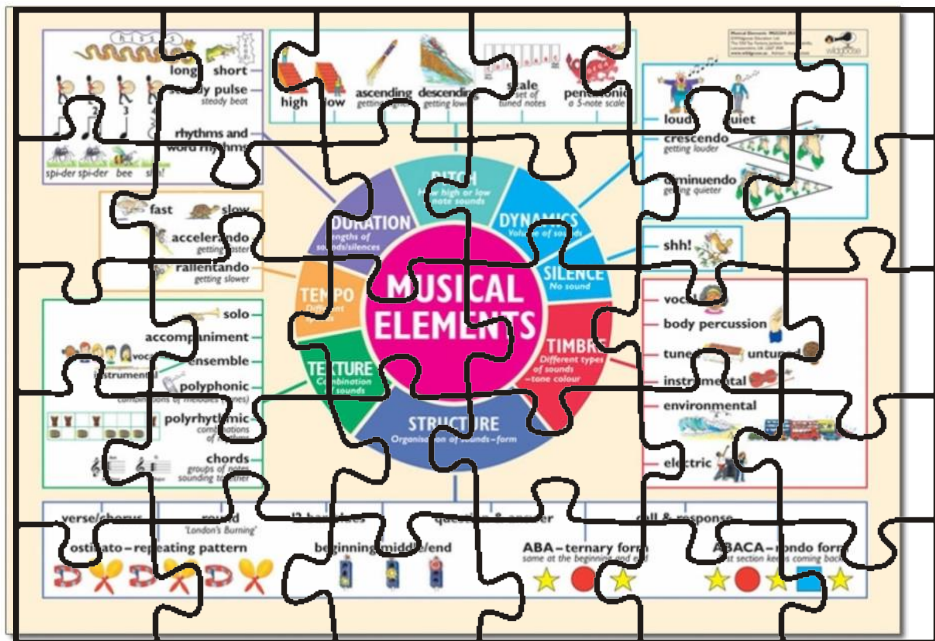
Scaffolding activities are meant to override the need for verbal explanation of new information until after the students have interacted with it first. The goal is that they work with new knowledge through varied learning styles and in this way, they can practice critical thinking. By working on their own, first, you are giving them time to assimilate elements at their own pace and in different ways. Later, if you need to explain parts of the information verbally, they will have a stronger basis upon which they can construct the new concepts.

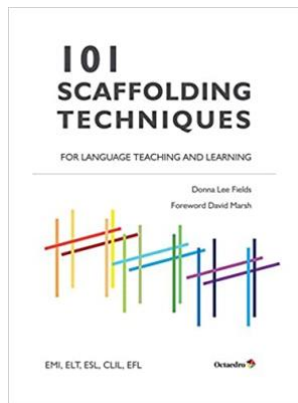
*\* One of the challenges of teaching mathematics is to evaluate how much direct instruction to give students versus how to support them at a distance as they engage in self-learning. We need to trust that students can gain knowledge by themselves through problem-solving activities - on their own or in groups. We can facilitate strategies that they can use, but learning goes much deeper when they arrive at explanations and answers without being directed and/or told explicitly what the answers are.*

6. Prepare questions on the information in the puzzle. In this way, those pairs/groups who finish before others have a meaningful extension to do while the others are finishing. In some cases, you might even include the questions in the puzzle itself.
  
7. *Formative Assessment:*
  - a) Give groups different addition problems than appeared in the puzzle. They come up with corresponding multiplication equations.
  - b) Ask groups to summarise/conclude/paraphrase the information.
  
8. *Reflection:* Students write 75-100 words on the dynamic of the activity and how it felt to come up with the concept of multiplication by themselves instead of through direct teaching.

*Other examples of puzzles as scaffolds In these cases, you print out copies of the information on different colored paper, one copy of the template. Then, place six copies of the information under one template and in this way you can cut six at a time.*







[amazon.com](https://www.amazon.com)

*Video explanation of scaffold...*



*transcript of the video explanation...*

Hi! I'm Donna Fields and welcome to CLIL Scaffolding 2. This is a series of webinars designed to give you quick, easy and adaptable scaffolding techniques.

Scaffolding, we can say, is helping students to transition into new material more easily without experiencing cognitive overload (I like to use the image 'giving a helping hand!'). Today we're going to see how easy it is to adapt Scaffolding Technique No. 5 to your lessons. You can find the techniques in my book *101 Scaffolding Techniques for Language Teaching and Learning* that's also been translated into Spanish.

The objective for this session is to show how to adapt scaffolding technique No. 5 to a primary and secondary lessons. Remember that it's always important to share objectives with our students and co-create them whenever we can because it helps them feel more involved in their own learning.

Scaffolding Technique No. 5, is called 'All the King's Horses and All the King's men' and it refers to a children's poem about Humpty Dumpty who fell off a wall and had to be put back together again and this technique is about putting things back together again

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- we're going to use puzzles to help generate cognitive activity and to make learning fun!

We'll start with Secondary and let's say we're teaching a geography lesson. We come to a chapter that has a lot of definitions. The students need to know the terms and understand the definitions, but how can we make the information visible in a different way? How can we help them to interact with the material through thinking and through their senses? If we can do this, they will become involved in the material and then be more open to remembering it.

I usually work with text and images in my scaffolding techniques- because I love images - but also because studies show that this doubles the learning. This technique works better, however, without images. In this case, we want the students to focus on the text. So, I've taken these two pages of a geography text, scanned them in, eliminated the images, and combined the definitions onto one page.

Now, I print out the definitions on six different coloured pieces of paper...plus a template of a puzzle. (I use a template that has pieces that are very similar so that, again, I want the students to put the puzzle together by reading the text, and not by the shape of the pieces). I put the template on top of the six different coloured printed definitions and cut out the pieces. In this way you make six puzzles at once!

If you have more than 12 students, which most of you probably do, this means that you only have to do this 2-3 times! Once you cut them out, since they're different colours, it's easy to separate the pieces, and then you put them into CD covers. The CD cover simply makes it easier to handle the puzzle pieces, and you give one CD cover (one set) to each pair of students or each group.

Now let's look at a primary math class. It's the same process. You're moving into simplifying fractions. You take a deep breath and wonder how to approach the subject this year. You could go two ways. You could approach it through direct instruction, which is what most teachers do, or you could take a big leap of faith and let students try to understand it on their own. Do you want to see how you could do that? Let's include problem-solving and dialogic instruction and see how far our students get.

First, we create the problem-solving part of the activity - the puzzle. We write six equations in the puzzle, print it out on six different coloured pieces of paper, put the template on top, and cut out the pieces.

Because they're on six different coloured pieces of paper, you've made six puzzle sets at once. You've made six puzzle sets at once! Then you put them into a CD cover.

You give one set to each pair of students and they put the puzzle together as best they can. The first three horizontal pieces will be fairly easy for them. They'll need to create dialogues with each other to decide on the last two pieces.

At a given point in the lesson, show the answers and then ask them to work together - either in pairs or in groups - to come to some conclusions about how the last two pieces solve the equations. Have Reporters share their conclusions and you're now ready to begin working on simplifying fractions with more educated and involved students.

So, all you SUPER TEACHERS out there, thank you so much for joining and I look forward to seeing you at the next webinar. In the meantime, please leave me some comments at:

You can find me at these sites:

<https://scaffoldingmagic.com/>

and

[Linkedin](#)

[Pinterest](#)

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BYE!

- \* Hattie, John (2015). *Visible Learning and the Science of How We Learn*. Routledge Press.
- \*\* Hattie, John (2017). *Visible Learning for Mathematics: What works best to optimize student learning*. Corwin Mathem