DIGITAL SCHOOLHOUSE

Playful Computing Activity

Jazzy Jigsaw Puzzles

Introduction

Ever wondered how puzzle sets consisting of thousands of pieces are ever solved? All those pieces, mixed together, take them out of the box and what's the first thing you do?

Most people will make some attempt to begin to sort the pieces and assign some sort of order to the jumble that came tumbling out of the box. Jigsaw puzzles are well known to help develop strategic thinking and logical reasoning. What's less well known is that they also help develop computational thinking in a really fun way. x

This simple activity is one that can last for 5 minutes or 50 and is suitable for all age groups. Developed in collaboration with Code Kingdoms, Jazzy Jigsaws brings endless amounts of fun. Make your own Jazzy Jigsaws by dropping in any of your own preferred images; or print of the blank template and get creative with your own artistic masterpiece first.

Some Jazzy Computational Thinking Links

Algorithmic thinking – people who solve jigsaw puzzles regularly may often devise their own strategies for solving puzzles quickly. For example, consider the strategy (algorithm) below:

Find the edge and corner pieces

1. Place the corner pieces
2. Sort the pieces to find the edges
3. Join the corners by placing the edge pieces (to create a frame)
4. Find pieces with a similar pattern and/or colour and group together
5. Place and fit similar pieces together
6. Arrange groups of puzzle pieces within the frame
7. Complete the puzzle by adding in the missing pieces

Decomposition – taking a large image and breaking it down. Or solving the entire puzzle by resolving smaller groups of it first. Chunking up a problem into smaller more manageable chunks is an effective way to solve a problem. We often find that we do this in Jigsaw puzzles, by solving smaller parts of the puzzle first and then collectively putting them together to form the whole. (*Note: this will be easier to see of puzzles with larger pieces*)

Abstraction – the completed puzzle forms an image, a model/representation of something and can hide the complexity of all the separate pieces required to fit together to complete it.

Generalisation – If we arrive at one strategy to solve a single puzzle quickly and effectively, will the same strategy work for other jigsaw puzzles or will we need to make adjustments to our algorithm to accommodate multiple puzzle sets?

Evaluation – testing out our strategies for solving puzzles and improving them along the way.

Activity Outline

Set the challenge – who can solve the puzzle the fastest? Play against your child, or if you have a few children then give them a puzzle each to complete.

Difficulty options:

- show them the final image that they should be creating (*easier*)
- keep the final image being made a secret (*challenging*)
- allow 'sneak peaks' at the final image (*mid-way*)

Trying variations of this can lead to useful discussions about their approach as they solved the puzzles. Why is it easier if you know what you are making? If you can't see the what the final outcome is supposed to be then what strategies do you rely on to solve the puzzle? Or are these different to what you would have done if you'd known what the final result is?

Discuss with your child:

- How did you solve the puzzle?
- Did you have a plan?
- What did you do and why?
- Do you use the same strategy to solve all your puzzles?

It will be useful to compare to see if you and your child had the same approach to solving the puzzle

Time to turn this into an algorithm. Can your child write down their strategy as a series of instructions?

Now test the algorithm on a new jigsaw puzzle

Evaluate your strategy. Did it work? Did anything need to be changed? If so, then what and why?

Write an algorithm to complete the new puzzle set *specifically*

Swop your algorithms over. Solve the same puzzle using the algorithm that your child designed (and vice versa). Does it work? How could the instructions be improved?

Now try handing over a new jigsaw puzzle set. Before you child begins to solve it, ask them to examine the pieces. Have a discussion with them to see if the algorithm that's been written will work with this new puzzle. Or will it need to be changed?

As a final wrap up it is worth considering how good the algorithms were. Did they need to be changed from one puzzle set to another?

Adding More Jazz (Extended Activities!)

Going Digital

http://www.dailyjigsawpuzzles.net/puzzle-maker.html is one example of an online puzzle maker that allows you to upload your own images and convert them into puzzles. Using the images downloaded as part of this activity, an alternative way to carry out the tasks set could be to use the online puzzle maker instead of physical puzzles.

However, the puzzle maker can also serve a different purpose. Once your child has had a chance to explore the physical puzzles, tell them to have a go at the puzzle maker, trying out different puzzles. What are the features of the website. It might be worth searching for additional jigsaw puzzle websites to compare common and differing features. Using what they have learnt and through discussion they can then consider the key elements of the online jigsaw puzzle; for example:

- The individual pieces – each piece is a separate object
- The user can click and drag the pieces into different positions
- The pieces become fixed when placed correctly

Children can then go through a design process to eventually create their own puzzle maker in a free online programming environment such as Scratch. Although it is recommended that before children begin designing their own, their first step in the process is to explore existing solutions, which can be found here: https://scratch.mit.edu/search/projects?q=jigsaw+puzzle. They can then use the information gleaned from here to devise their own interactive jigsaw puzzle.

< Blank Page >