



Don't Forget!

Activity 2: Grades 9-12

Puzzle Solving

Memory, like most brain abilities, seems to suffer fewer ravages of aging in individuals who keep mentally active. Scientists believe this may be due to the continued reinforcement of the brain cell pathways along which thoughts travel. As you think, messages move along the living network of brain cells. When a brain cell is stimulated, it releases chemicals called neurotransmitters. Some neurotransmitters carry messages to neighboring cells. Others maintain the health and longevity of the inter-cellular connections. Still others encourage the growth of new cell connections to produce even more robust pathways. So by using an assortment of thinking pathways, you can sustain and even improve the fitness of your network of brain cells.

This activity page will offer:

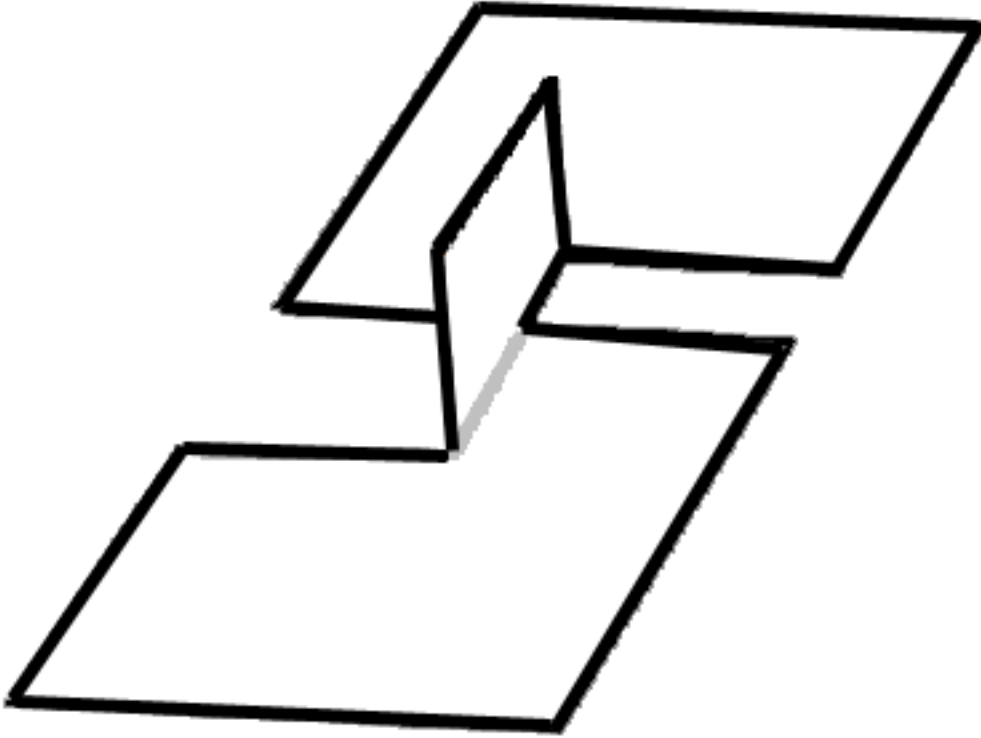
- A minds-on and hands-on experience in puzzle solving
- An opportunity to apply and sharpen critical thinking skills
- An arena to think out of the box
- An opportunity to create a puzzling challenge

Puzzle Solving

Recent research suggests that puzzle solving may be more than just a pleasant hobby or pastime. It may have a therapeutic role in preventing or at last delaying senility. Puzzles often require novel or creative approaches to examining situations. This engages a robust series of brain cell connections. Here is an assortment of puzzles that should not only entertain and challenge you, but also stimulate the growth and health of your brain cell.

Build This Bend

Examine the diagram. Note the unique orientation of the bend, especially how it relates to cutout regions of the base card. Okay, now that you've seen it - create it. Using one rectangular scrap of paper and scissors, manufacture this shape. **HINT:** The answer may be more twisted than the bend's odd appearance.



Rate This Puzzle

Working independently, three teachers can grade three exams in three hours. Using this same rate, how long would it take four teachers to grade four exams?

No Calculus Allowed

Here's a thinking challenge that at first may seem as if it requires higher math to solve. It doesn't. The solution is simple, as long as you can uncover the logical connection in the puzzle pieces.

Suppose your friend trained a falcon to fly from her shoulder to the shoulder of a designated target. Once at that target, the falcon reverses direction and immediately heads back to her shoulder. Once there, however, the falcon flies straight back to the target. On and on it goes, until the poor bird becomes too exhausted to reversing direction without any loss of time or change in speed.

Now, here's the challenge. You and your falcon-training friend are situated 12 miles apart. You begin walking towards each other, both at a constant speed of 3 mph. At the moment you begin, the falcon leaves her shoulder and flies to your shoulder. Once there, it reverses direction and returns to its trainer. Back-and-forth the bird flies until you and your friend meet.

If the falcon flies at a constant velocity of 30 mph, how many miles did it cover in its series of back-and-forth flights? Assume that no time is lost and the bird immediately reverses direction upon reaching each person.

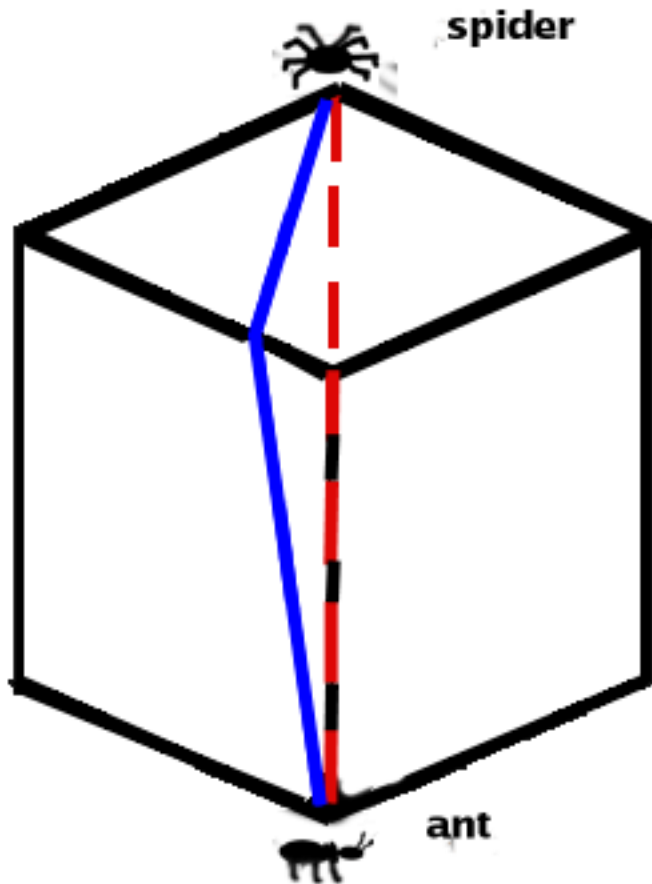
Nesting Dolls

Nesting dolls are toys that contain smaller and identical toys within their hollow structure. Suppose you had a nesting doll that was one foot tall. Each nesting doll within this one was one half the size of the previous doll. Suppose there were an infinite number of dolls and you removed them and placed them atop of each other. About how tall will the stack rise?

Spider and the Ant

Suppose a spider was sitting at one corner of a sugar cube. An unfortunate ant was positioned at the opposite corner. The spider plans its strike by inferring the shortest path along the cube surface as shown by the dashed line.

However, in this case the shortest distance over the surface is NOT shown the dashed line. The shortest path is the bent line illustrated by the solid blue line. Can you explain?



Make Your Own Puzzle

Do you think you can create your own puzzle? It may not be as difficult as you think. Consider the parts of a puzzle. How does the "trick" fit into the strategy for solving a puzzle? Take another look at the previous puzzles. What tricks, novel solutions, or "exceptions to the rules" might be applicable to the creation of a new puzzle? Create a new puzzle scenario and share it with classmates.

Web Connection

Brain Teasers for Education and Fun

<http://7-12educators.about.com/blbrainteasers.htm>

An assortment of grade 7-12 brainteasers, riddles, and lateral thinking puzzles.

Brain Boosters

<http://school.discovery.com/brainboosters/#number>

A robust assortment of math and logic puzzles.

Puzzles Online

[http://puzzles.about.com/gi/dynamic/](http://puzzles.about.com/gi/dynamic/offsite.htm?site=http://www.puzz.com/index.html)

[offsite.htm?site=http://www.puzz.com/index.html](http://www.puzz.com/index.html)

A free online puzzle book with all sorts of puzzles and math thinking skill challenges.

Leisure Activities Help to Decrease Dementia Risk

<http://www.aecom.yu.edu/home/news/leisure.htm>

A short synopsis on research done at Einstein College of Medicine on dementia onset and the active mind.



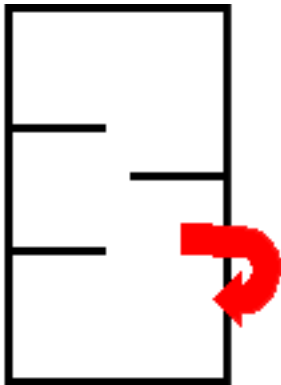
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Puzzle Solving

Build This Bend

The twist on the answer arises from a twist placed in the strip itself. Make three cuts in the card as shown in this pattern. Then twist half the card by one-half rotation. The new geometry, based upon a Mobius strip, displays the paradoxical bend.



Rate This Puzzle

Three hours. If you analyze the first situation, you discover that it takes one teacher three hours to grade one exam. Therefore, if four teachers were grading four exams, it would still take each teacher three hours to grade the one exam they were working on.

No Calculus Allowed

60 miles. The trick is to independently connect the walkers and bird through the time spent in travel. Using basic calculations, it takes the walkers two hours to meet. In those two hours, the bird (flying at 30mph) has covered 60 miles. Simple.

Nesting Dolls

It would approach two feet in height. Each doll gets you a little closer (but never reaching) the 2-foot height.

Spider and the Ant

The paradox lies in the 3D layout of the cube surfaces. When the six cube faces are unfolded, the dashed line shows the actual course across the surface. As you can see, the dashed line now appears to be made up of two shorter line segments. The shortest path is a straight line illustrated by the blue solid line.

