Activity 4.2 answer key

Using problem-solving to engage learning

**Problem 1:** Well-structured problem, requiring concurrent visual rotation in both directions. Answer = 4 progressions.

**Problem 2:** Well-structured problem, requiring appropriate knowledge base. Answers = suppress and reserve.

**Problem 3:** Well-structured problem, requiring mathematical pattern analysis. Answer = 28.

**Problem 4:** Well-structured problem, requiring appropriate knowledge base. Answer = augment.

**Problem 5:** Well-structured problem, requiring science knowledge base. Answer = b.

**Problem 6:** Ill-structured problem, requiring lateral or creative thinking. One plausible answer = the gladiator pulls one slip from the bag and quickly eats it. He then turns to the crowd and proclaims that his fate is now in the hands of the emperor, who must draw the remaining slip from the bag and read it to the eager audience. Since the emperor himself has declared that freedom and death were written on the two slips, then the fact that the remaining slip contains death means that the gladiator must have drawn the freedom slip, forcing the emperor to free him in front of the crowded colosseum.

**Problem 7:** Disguised Ill-structured problem, requiring lateral or creative thinking. In this case you need to re-think what squares might mean in abstract terms, as here it refers to the mathematical concept of multiplying a number by itself, not to the concept of a visual square. The answer, therefore, is to add the lines as shown below, in order to make the number 49. As a number, 49 contains three squares, in the sense that 4 is the square of 2, 9 is the square of 3 and 49 is the square of 7.

**Problem 8:** Issues problem, with no categorical answer. Precisely because of this, that debate will be generated by this sort of problem.

Here are some websites to visit in relation to the role of problem-solving as an aspect of instructional design. You will find lots of instructional aids, design tools and other professional scaffolds on these sites.

* [Teaching problem-solving – secondary school science](http://www.ericdigests.org/pre-9212/problem.htm). *ERIC/SMEAC Science Education Digest*, No. 2.
* ['The problem-solving process'](http://www.gdrc.org/decision/problem-solve.html) – The Global Development Research Centre.
* ['Problem-solving'](https://en.wikipedia.org/wiki/Problem_solving) – Wikipedia; see in particular the section 'common barriers to problem-solving', which gives you a good overview
* ['Problem-solving'](http://www.mindtools.com/pages/main/newMN_TMC.htm) – Mind Tools; see the section on 'problem-solving approaches'