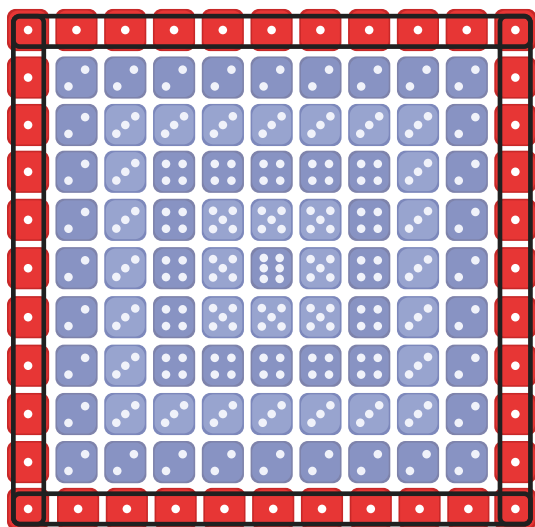


## What is your teaching focus? What skills or knowledge do you want pupils to develop?

In this lesson, I used worked examples to develop pupils' thinking around generalising either using words or algebra. I also wanted pupils to have an increased awareness of the variety of possible approaches to a single problem. I hoped that this would help them understand that there are multiple possible ways to be successful, whilst also encouraging them to critique different strategies.



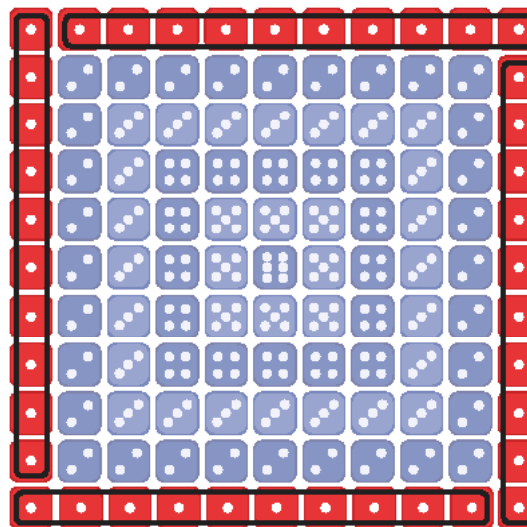
### Worked Example 1:



*"The red dice can be thought of as four rows of 11 dice.*

*Each row contains 11x1 spots, so there are 44 white spots."*

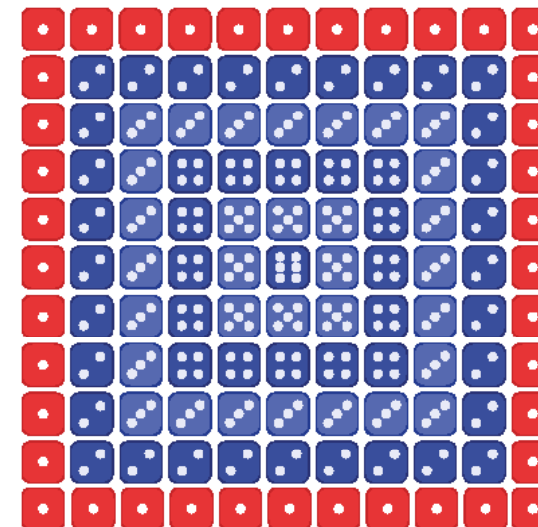
### Worked Example 2:



*"The red dice can be thought of as four rows of 10 dice.*

*Each row contains 10x1 spots, so there are 40 white spots."*

### Worked Example 3:

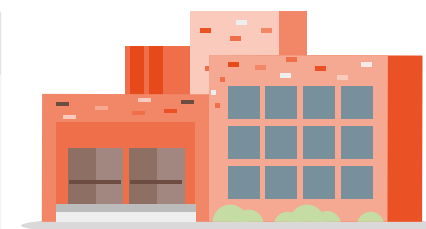


*"Red is 11x11 square. All others are inside a 9x9 square.*

*So there are 11x11-9x9 white squares, so white has (121-81)x1=40 spots."*

## School Context:

These worked examples were developed by Tom Lumley, maths teacher at South Hunsley School, and Secondary Professional Studies Lead for Yorkshire Wolds Teacher Training. They are based on a problem shared by Jonathan Hall (@studymaths) via Twitter, and have been used with both Year 8 and Year 9 pupils as a way of opening up discussions around approaches to problem-solving.



## How did you use this?

Before sharing the worked examples, pupils were asked to look at the problem and record their instinctive approaches. This was done in an attempt to prompt pupils' own thinking about the range of different ways to approach this problem, and also served as an opportunity for some initial formative assessment. Pupils were explicitly asked not to find possible solutions, but instead to focus on identifying possible starting points and the initial steps they would take in their journey towards this.

Three worked examples were then shared with pupils, this included one worked example including a mistake. Pupils were asked to consider the worked examples using the following question prompts:

- Which approach do you prefer and why?
- Are all approaches valid?
- Is there another way to approach this?

Once pupils had considered the worked examples, they were encouraged to identify and evaluate more possible approaches.

## What were outcomes for pupils?

The worked examples prompted very helpful conversations around efficient approaches, and encouraged pupils to explain their reasoning that underpinned their thinking.

I found it particularly useful to highlight that one of the strategies didn't work so that pupils looked critically at the approaches which were featured, and didn't just assume that a strategy worked because I introduced it! This also supported pupils' later independent work, as most were able to identify that some of the approaches they found contained errors. I think that this highlighted possible misconceptions for pupils and helped emphasise the importance of monitoring and evaluating the approaches they were considering.

## Advice for practitioners:

When sharing worked examples which include mistakes, ensure that errors are clearly signposted and encourage pupils to unpick these, considering the underlying reasons why the mistakes were made. This can support pupils to avoid making similar mistakes in their own work and can help address common misconceptions.

Some pupils did easily deduce which approach included the mistake as the other two worked examples produced the same answer! When using worked examples including mistakes, it may therefore be useful to avoid this by removing answers altogether or by sharing just one correct and one incorrect approach. I believe this may be more beneficial in prompting pupils to identify which example contains the mistakes through analysis of the approach itself.

## Additional Resources:



Guidance Report: Improving mathematics in key stages 2 and 3  
[eef.li/maths-ks2-ks3](https://eef.li/maths-ks2-ks3)



Guidance Report: Metacognition and self-regulated learning  
[eef.li/metacognition](https://eef.li/metacognition)