

*Read this aloud in your group first!*

Main Question: Which pairs of cogs let the coloured tooth go into every gap on the other cog? Which pairs do not let this happen? Why? Can you explain how to determine which pairs will work, and why?

Each member of your group will get two or three cogs to investigate. Before you begin, colour one tooth on each cog.

- 1) Your task is to investigate the cogs you have. Choose a pair of cogs at a time and find out if the coloured tooth on one cog goes into every gap on the other cog.
- 2) When you have determined that, record your work and swap one cog with another group member.
- 3) Investigate the new cog pair and repeat until all combinations of cogs have been investigated in your group.
- 4) Discuss any patterns you see with your group.  
What questions do you have?  
What conjectures can you make about why certain pairs work and others don't?
- 5) Record what you notice, any conjectures you have and any questions you would like to ask ready to report back to the whole class.