

## MARC BRUNEL TUNNELING CHALLENGE

This exercise needs a minimum of two people.

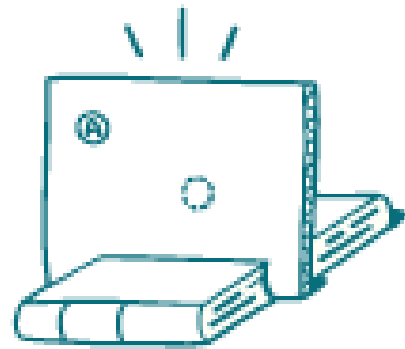
You will need:

A large piece of corrugated cardboard or foam-core board

2 books or blocks

2 ballpoint pens

Ruler



### How good are your directions?

One major challenge of building a tunnel is making sure that the teams digging from each side meet in the middle. In this activity you will need to describe the location of a tunnel opening on one side of a piece of cardboard to your teammate (e.g. sibling / parent...) who will try to recreate it on the other side.

### Make a Prediction

Predict how close your teammate will be able to get to your tunnel entrance. Why do you think so?

### Try It Out

1. Stand the cardboard up on one edge between you and your teammate. Place a book on each side of the cardboard to hold it up.
2. Holding onto the cardboard to keep it standing, draw a circle about the size of a penny somewhere on your side of the cardboard. Label the circle A. This is the entrance to Tunnel A. Your teammate should draw a circle somewhere on the other side of the cardboard, and label it B (the entrance to Tunnel B). The player who isn't drawing should turn away whilst their teammate draws!
3. Now describe the location of the Tunnel A entrance to your teammate as precisely as you can. Your partner should describe the location of the Tunnel B entrance to you.
4. Based on their description, draw the other end of your partner's tunnel on your side of the cardboard. Your partner should do the same.
5. Use the pen to carefully punch a hole where you think your partner's Tunnel B is. Your partner should punch a hole where they think Tunnel A is. Now turn the cardboard around to see how well you both communicated!

### Explain It

How closely did the two ends of each tunnel match up? If one tunnel matched more closely than the other, what do you think accounts for the difference? How is this challenge like the challenge engineers face in digging a long underground tunnel?