30 minutes

Grades 3–5, 6–8

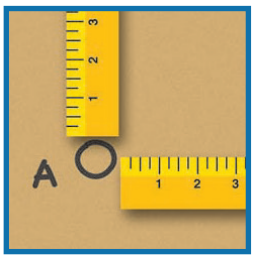
Tunnel Meetup

Find the entrance of a tunnel without being able to see it.

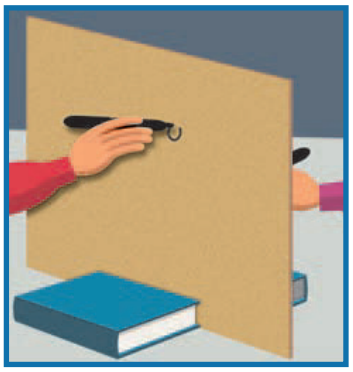
Instructions

Students discover the importance of precise measurements and communication as they help each other try to find a tunnel entrance without being able to see it.

1. After explaining the goal of this activity, have partners stand their board up between them and hold it in place with the books or blocks.
2. Each team member decides where the entrance of the tunnel on his or her side of the cardboard should be located. One side is Tunnel A, and the other Tunnel B. Without telling their partner, the students draw their tunnel entrance (a penny-sized circle) on their side of the cardboard.
3. Partners take turns describing the location of their tunnel entrance, using the ruler to give measurements. Based on this description, listening partners draw where they think their partner's entrance is.



4. Each partner punches a hole through the cardboard where he or she thinks the other partner's entrance is.
5. See how well the partners communicated!



Materials

PER PAIR:

- ☐ Large piece of corrugated cardboard or foam-core board
- ☐ 2 books or heavy blocks
- ☐ 2 ballpoint pens
- ☐ Paper
- ☐ Ruler

Engineering & Science Connections

- One challenge of civil engineering is making precise measurements to ensure that teams building from each end of a project meet at the exact spot. This was even an issue in building the first intercontinental railroad, with east and west teams meeting at Promontory Point, Utah.
- The Channel Tunnel runs from England to France. The tunnel was started from each country and had to meet in the middle under the English Channel! When the two tunnels were close to meeting, the design and construction team drilled probe holes to confirm the alignment. The initial alignment was off by about 14 inches side-to-side and only 2 and a half inches vertically. This was very accurate considering the tunnel is 31 miles long. They were able to correct the alignment in the remaining excavation.
- Tunnels are critical to modern life. We need them for cars, trains, water, sewage, power, and communication lines.
- In the Middle Ages, invading armies used to make secret tunnels under the castles they were trying to get into. They built them in the sandy soil under the moats and held them up with timbers. But rather than invading underground through the tunnels, they burned the timbers to collapse the tunnels, hoping to also collapse the castle.

Guiding Questions ?

Is your partner understanding you easily or do you need to be more precise?

Is right and left on your side of the cardboard the same as on the other side?

What would be a good method to make the two entrances only using tools rather than verbal communication?

This activity is from American Society of Civil Engineers: Building Big.