

Design a Device Challenge Project

Answer Sheet

You and two to four friends have been taken prisoner in a foreign country. You are going to try to escape from the prison. In order to escape, you must time the movement of the guards exactly! You have to design a method of timing 3 minutes – the time it takes the guards to change posts – so you can make your break.

Materials (available in your cell):

String (shoe laces)

Paper

Soap (one bar)

Small Ball

Water Bottle (water is available)

Glue (made from oatmeal, you can use real glue)

Coins

2 decks of playing cards

Dominos

3 **simple** items you are able to have smuggled in, no clocks, watches, computers.

Okay, here we go:

You can get things smuggled in. Get a ruler, and a razor blade.

1. Using the razor blade, cut the string into three pieces.
2. Tie an end of each of the three strings to the ruler, one piece at each end, one in the middle.
3. Hang the ruler from a high place, using the center string. You now have a makeshift balance scale.
4. Tie a deck of cards to one end-string and let it hang down as a weight.
5. Fill the water bottle. put a small hole in the bottom, so water drips out slowly.
6. Tie the water bottle to the other string, at the opposite end of the ruler. The full bottle will be heavier than the deck of cards, so the scale will tip in the direction of the bottle.
7. As water drips out, the bottle will get lighter until the weight of the deck of cards is more than the bottle, and the scale will tip the other way.
8. You can adjust the timing of the balance point by gluing coins to the ruler as appropriate counterweights.