Your fingers tremble in anticipation as you lift the diamond from its stand. For one perfect moment, you stand there with the gem glittering in your hands. Then, your heart drops into your stomach like a rock. Red lights flash and alarms blare as you watch the little diamond stand descend into the platform. You forgot to switch the diamond out for something of equal weight, the most basic heist move. You look at your crew, your own shock mirrored on their faces. Then, you clear your thoughts enough to yell, “run!” and you take off down the hall back the way you came. You run through hallways with your crew trailing just behind you. Suddenly, you see a grey blur and hear a loud clang, a split second before running straight into a wall and falling flat on your butt. You look up dazedly and see a large metal security wall that must have slide down from the ceiling, blocking your way.

The hacker’s well-trained eyes quickly spot a small electrical panel on one side of the wall. They hurry towards it and start inspecting wires. Within seconds, they’ve patched a small screen and keypad into the wires. After a minute of investigation, they say, “It seems there is a door in every hallway. Each door has a separate code needed to deactivate it. We’ll need to act quickly to crack them all before the back-up guards arrive.”

Door 1: Classify the following as chemical (C) or physical (P)

1. Baking a cake
2. Sun burn on skin
3. Melting ice
4. Blowing up a balloon

Door 2: Classify the following as chemical (C) or physical (P)

1. Something gets bigger
2. Something changes colour
3. Something changes state
4. Something creates light

Door 3: Classify the following as synthesis (S), decomposition (D), single displacement (SD), double displacement (DD), complete combustion (CC), or incomplete combustion (IC)

1. AB + CD → AD + CB
2. A + B → C
3. CxHy → H2O + CO2 + CO + C
4. AB → A + B

Door 4: Classify the following as synthesis (S), decomposition (D), single displacement (SD), double displacement (DD), complete combustion (CC), or incomplete combustion (IC)

1. Na + Cl →
2. C2H4 + O2 (lots) →
3. HCl + NaOH →
4. Zn + CuCl2 →