Dusk drapes the National Science Museum in a cloak of shadows as the last rays of sunlight dip below the city buildings. The air is heavy with anticipation as you and your team scurry across the street and start circling the museum, looking for the entry location. About halfway down the wall, you spot it. The barred window is out of reach, but years of leaping across rooftops and darting through alleys have honed the cat burglar’s skill. In one fluid motion, they leap into the air, grab the window ledge, and swing themself up. As they perch, balanced on the ledge, they call down in a loud whisper, “Each bar seems to be made of a different metal. We need to find the correct acid to dissolve each bar to gain entry to the museum.”

First bar: Find the acid

1. Substance has a pH of 5
2. Substance turns red litmus paper blue
3. Substance doesn’t dissolve in water
4. Substance has a pH of 7

Second bar: Find the acid

1. Substance makes red litmus paper stay red and blue litmus paper stay blue
2. Substance ends in OH
3. Substance makes blue litmus paper turn red
4. Substance has a pH of 12

Third bar: Find the Hydrofluoric acid

1. HBr
2. HF
3. NaBr
4. NaF

Fourth bar: Find the Hydrochloric acid

1. HBr
2. HCl
3. HClO3
4. H2SO4

Fifth bar: Find H2SO4

1. Hydrosulfuric acid
2. Sulfuric acid
3. Hydrobromic acid
4. Bromic acid

Sixth bar: Find HBr

1. Hydrosulfuric acid
2. Sulfuric acid
3. Hydrobromic acid
4. Bromic acid