both permanent magnets and electromagnets can be thought about in the same way

permanent magnets can be modelled by gluing together many small bar magnets

the small bar magnets are sometimes side by side, and sometimes end to end—then maybe shaped to give, e.g. a horseshoe or cylindrical magnet (for loudspeakers)

electromagnets can all be modelled by gluing together many short lengths of current-carrying wire

the lengths of wire are often cunningly arranged to make coils of various shapes

forces can be exerted without contact

by permanent magents

by electromagnets

on some classes of materials

some materials are magnetic

some materials are non-magnetic

fields are used to predict forces

the field of a bar magnet is a common pattern, worth memorising

work out more complex patterns by adding together fields of bar magnets: two bar magnets repelling or attracting, a pair of slab magnets

the field of a current-carrying wire is a common pattern, worth memorising

work out more complex patterns by adding together fields of current-carrying lengths of wire: mostly coils at this stage