Group 2 elements are known as the Alkaline Earth Metals. They display a number of different trends as the group is descended. Going down the group, Atomic Radii INCREASES; this is because as you go down the group additionally shells of electrons are 'added' increasing the radius of the atom. Oppositely, down the group the melting temperature of group 2 elements DECREASES. This is because the size of the atom increases, which means the distance between the positive ions and the delocalised electrons decreases. Because of this increase in distance, the attractive forces between the positive ions and the negative delocalised electrons, weakens which causes metallic bonding to weaken. This means less energy is required to overcome the attraction. Ionisation energy DECREASES down the group. This is because the radii increases which means the electrostatic attraction between the outermost electron and the positive nucleus decreases and so the electron is less tightly held. Additionally, as additional shells are 'added', the shielding effect increases and the negative-negative repulsion between opposite orbital electrons is greater – meaning less energy is needed to remove the electron.

Group 2 hydroxides and sulphates display certain trends. Group 2 hydroxides become more soluble down the group and Group 2 sulphates become less soluble down the group.

Group 2 elements can be distinguished from and identified by, flame tests.
A flame test is conducted by dipping a nichrome wire in HCL (to remove impurities), and then heating over a Bunsen flame. Dip the wire in the solid and then place over the flame. The application of heat causes the electrons in the metal to become 'excited' and 'jump' to a higher energy level. At this higher level, the electrons are unstable and so drop back down to a lower level. Energy is emitted in the form of light – corresponding to a certain frequency on the spectrum, giving a unique colour for each metal.

Lithium appears RED
Sodium is YELLOW
Potassium is LILAC
Strontium is CRIMSON RED
Barium is APPLE GREEN
Calcium is BRICK RED
Magnesium is COLOURLESS
(Caesium is BLUE)

In the same way Group 2 hydroxides and sulphates show trends, Group 2 carbonates and nitrates too show trends, one of which is thermal stability. As you go down the group, Group 2 carbonates and nitrates become MORE stable – stability increases down the group. This is because going down the group means the ionic radii of the Group 2 cation increases and so the charge density reduces, which lowers the polarising effect. As the polarising effect reduces, the nitrate or carbonate anion becomes less distorted and therefore LESS destabilised. Therefore more energy is required.

Group 2 carbonates react like so:
$MCO_3(s) \rightarrow MO(s) + CO_2(g)$ (Oxide and Carbon Dioxide)
And Group 2 nitrates:
$2M(NO_3)_2(s) \rightarrow 2MO(s) + 4NO_2(g) + O_2(g)$ (Oxide, NO_2, Oxygen)

Group 1 carbonates on the other hand, are stable to heat and so do not decompose. This is true for all carbonates apart from Lithium.

Lithium Carbonate:
$LiCO_3(s) \rightarrow LiO(s) + CO_2(g)$ (Same as Group 2)

Normal Group 1 Carbonate:
No thermal decomposition ☹

Lithium Nitrate again is different to other Group 1 nitrates:
$2LiNO_3(s) \rightarrow 2LiO(s) + 2NO_2(g) + O_2(g)$ (Same as Group 2)

Normal Group 1 Nitrate:
$2NaNO_3(s) \rightarrow 2NaNO_2(s) + O_2(g)$ (Metal NO_2 and Oxygen)