|  |  |  |
| --- | --- | --- |
| **Decomposition or**  **Disintegration** of rock at the same site, at or near the surface. | Ice has ~ 9% greater volume than water | Water enters cracks or pores; freezes and thaws repeatedly. Rock is weakened and can break. |
| **Physical** or **Mechanical** | No alteration of minerals | Some minerals decay or have their bulk increased. |
| **Chemical** | Hydration | Hydrolysis |
| Disintegration | Oxidation | Carbonisation |
| Decomposition | Chelation | Solution |
| Frost Action | All processes require water. | Both can happen at the same time. |
| Pressure release | Wetting & drying causes swelling- up to 60% in some shales. | Soluble minerals dissolved. |
| Crystal growth | Salt and Ice | Chemical reactions weaken rock structure and change volume. |
| Burrowing animals | Plant roots | Important in semi-arid climates, and coastal regions. |
| Ice crystals attract liquid water causing further crystal growth and pressure on rock. | Evaporation of water from saline solutions leads to salt crystal growth and rock weakening. | Burrowing animals and plant roots exploit cracks within rocks and may extend them. |
| Carbon dioxide in rainwater or soil water reacts with minerals, especially in limestones | Insoluble minerals become soluble. | Climate.  Micro-climate.  Rock susceptibility. |
| Insolation/exfoliation/  onion skin/sheeting/  spheroidal weathering. | Surface erosion reduces pressure so rock expands and weakens; especially granite. | Organic acids from plants and animals react with rock minerals. |
|  |  | Adding or removing  oxygen from (especially) metal particles. |

**Grave Headstone Weathering**

|  |  |
| --- | --- |
| **Class** | **Description** |
| **1** | Unweathered |
| **2** | Slightly weathered. Faint rounding of corners of letters |
| **3** | Moderately weathered. Rough surface but letters can be read. |
| **4** | Badly weathered. Letters becoming difficult to read. |
| **5** | Very badly weathered. Letters almost indistinguishable. |
| **6** | Extremely weathered. Letters worn away; scaling of headstone. |

**1790A tombstone in a cemetery

Description automatically generated**

**1824A tombstone in a cemetery

Description automatically generated**

**Grave Headstone Weathering**

|  |  |
| --- | --- |
| **Class** | **Description** |
| **1** | Unweathered |
| **2** | Slightly weathered. Faint rounding of corners of letters |
| **3** | Moderately weathered. Rough surface but letters can be read. |
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| **5** | Very badly weathered. Letters almost indistinguishable. |
| **6** | Extremely weathered. Letters worn away; scaling of headstone. |

**1820A tombstone in a cemetery

Description automatically generated**

**1810A tombstone in a cemetery

Description automatically generated**

A rocky mountain with a pink sky

Description automatically generated

