# Volcanic Identification

Your job is to identify the type of volcano that created the Ashfall Fossil Beds site. First compare the "Ashfall Data" with information about three main types of magma (mafic, intermediate, felsic) listed in the "Magma and Eruption Characteristics" chart. Then fill in the "Ashfall Conclusions" section at right with your conclusions.

## Ashfall Data

**Ashfall Tephra**

**Ash Composition (percentage by weight)**

| Aluminum Oxide ($Al_2O_3$) | Calcium Oxide (CaO) | Iron Oxide (FeO)* | Potassium Oxide ($K_2O$) | Magnesium Oxide (MgO) | Sodium Oxide ($Na_2O$) | Titanium Dioxide ($TiO_2$) | Phosphorous Pentaoxide ($P_2O_5$) | Silicon Dioxide ($SiO_2$) |
|---|---|---|---|---|---|---|---|---|
| 11.80 | 0.60 | 2.80 | 6.30 | 0.10 | 2.60 | 0.20 | 0.08 | 75.50 |

*combined concentration of FeO and $Fe_2O_3$

## Ashfall Conclusions

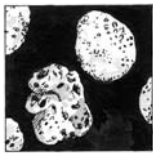
**Type of ash at Ashfall:** (circle one)

mafic intermediate felsic

**Type of eruption most likely to have created Ashfall:**

**Type of volcano form most likely to have created Ashfall:**

## Magma and Eruption Characteristics

| | Mafic | Intermediate | Felsic |
|---|---|---|---|
| **Ash Composition** | 48–52% $SiO_2$; high in FeO, MgO, CaO; low in $K_2O$, $Al_2O_3$, $Na_2O$ | 53–65% $SiO_2$; moderate amounts of all major compounds | >65% $SiO_2$; high in $K_2O$, $Al_2O_3$, $Na_2O$; low in FeO, MgO, CaO |
| **Magma Characteristics** | High eruption temperature (>1000°C); low resistance to flow (thin, runny lava) | Medium eruption temperature (900°C–1000°C); medium resistance to flow (somewhat thicker, sticky lava) | Low eruption temperature (600°C–900°C); high to very high resistance to flow (very thick, sticky lava) |
| **Eruptive Characteristics** | Relatively non-explosive; extensive lava flows | Relatively explosive; pyroclastic flows, ash falls, tephra deposits, volcanic gases, lahars | Highly explosive; enormous dark columns of tephra and gas high into the stratosphere; pyroclastic flows and surges; extensive ash fall |
| **Common Lava/ Tephra Type Produced** | Balsitic  | Andesitic  | Dacitic/Rhyolitic  |
| **Dominant Volcano Form** | Cinder cones<br>Shield volcanoes | Composite cones (Stratovolcanoes) | Calderas<br>Domes |