



## Pathfinder Honour: Trainer's Notes

# Rocks and Minerals



### Instructions to Trainers / Instructors of this Honour

Thankyou for being involved with this Honour. These notes have been developed to assist in teaching / instructing this honour. We recognise that there is much more information available and we are grateful that you should share your expertise.

Please remember that Honours are designed to develop our Pathfinders in many ways; their interests, their knowledge and their relationship with their Saviour and Creator. Your enthusiasm and creativity will have a huge impact on those doing the honour.

To complete an Honour, the following (where applicable) must be completed satisfactorily:

- Physical and Practical Requirements.
- Honour Workbook.
- Honour Assessment Sheet. *(On SPD Honour Website but Leader's level access is required)*

### Additional Reference Material

[http://en.wikibooks.org/wiki/Adventist\\_Youth\\_Honors\\_Answer\\_Book/Nature/Rocks\\_%26\\_Minerals](http://en.wikibooks.org/wiki/Adventist_Youth_Honors_Answer_Book/Nature/Rocks_%26_Minerals)

*Note: A useful site, but be aware that material on any Wikibooks website is beyond the control of the SPD.*

### Acknowledgements

South Pacific Division Honour Notes

Wikibooks (see above)

# Rocks and Minerals Honour

## REQUIREMENT 1: Distinguish between rocks and minerals.

**Rocks** are the materials of which the earth is made. They form mountains and underlie valleys. Included in this term are sand, clay and lava.

**Minerals** occur within rocks and are often components of rocks. A mineral is a chemical or mixture of chemicals.

## REQUIREMENT 2: Have a collection of at least different fifteen specimens correctly named. Label each specimen with collector's name, date, and locality in which it was found. Note: Three (3) high-quality photos with accompanying explanatory notes may be used in lieu of each physical specimen. (ie 45 photos for 15 physical systems)

## REQUIREMENT 3: Define and name two examples each (from specimens or pictures) of igneous, sedimentary, metamorphic.

**Igneous** rocks come from molten magmas. When they cool below ground they are termed Intrusive e.g. granite. When cooled above surface they are termed Extrusive e.g. Basalt and Pumice. They are formed by high temperatures.

**Sedimentary** rocks are laid down mainly in layers or strata by water. Unconsolidated rock i.e. sand, mud is called sediment. Consolidated rock is called Sedimentary rock. Often this type of rock contains fossils. Some are chemically formed – Petrified Wood, Sandstone, limestone and shale are well known sedimentary rocks. Wind will help form the layers.

**Metamorphic** comes from the Greek word meaning transform. Rock is sometimes changed from one type to another by action of heat, pressure or water or other liquid permeating it. All three types of rocks can be changed. Slate is shale transformed and limestone can be changed to marble.

## REQUIREMENT 4: What is meant by Mohs scale of hardness? Name the minerals in Mohs scale.

The scale was named after Frederich Mohs 1773 - 1839, a German mineralogist who conceived the idea of a list of minerals in an ascending order of hardness each unable to be scratched by the ones preceding it (each succeeding mineral is harder and should scratch all those below it).

### Mohs Scale of Hardness

1. Talc
2. Gypsum
3. Calcite
4. Fluorite
5. Apatite
6. Feldspar, Orthoclase
7. Quartz
8. Topaz
9. Corundum
10. Diamond

Hint.

To help remember Mohs scale, remember this:

*"To Get Chocolates From Auntie Fanny, Quit Teasing Cousin Danny".*

(From Wikibooks)

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Minerals are usually 6 or less. Gemstones are usually 7 or more.

Other methods of determining hardness:

Fingernail	2.5
Cent Coin	3
Glass	5 – 5.5
Knife Blade	5.5 – 6
Steel File	6.5 – 7
Silicon Carbide	9

(Carborundum, a small piece of sapphire will do the same)

**REQUIREMENT 5: Define the following:**

- Cleavage**
- Specific Gravity**
- Lustre**
- Colour**
- Streak**
- Texture**
- Crystal.**

## **Cleavage:**

Cleavage is the way some minerals split in certain directions.

## **Specific Gravity:**

This is the relative weight of a mineral compared to an equal volume of water

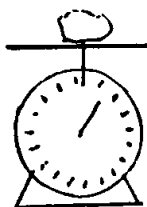
Density of substance / Density of water.

1 cc of lead weighs 11.4 grams

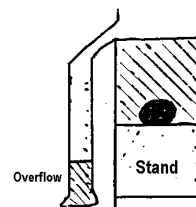
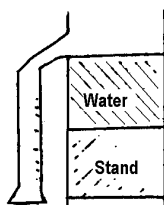
1 cc of water weighs 1 gram,

$$\begin{aligned}\text{Specific Gravity of lead} &= 11.4 / 1 \\ &= 11.4\end{aligned}$$

## Finding Specific Gravity



Weigh Dry



Overflow Measure Stone

Hint. Add a drop of detergent in the water to reduce surface tension and thus lessen the likelihood of bubbles causing an inaccurate reading.

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## Lustre:

This is the way in which a mineral reflects, refracts or absorbs light from its surface.

Adamantine or Brilliant	Diamond
Vitreous or Glassy	Quartz, Obsidian
Metallic, like metal	Galena, Gold
Pearly	Gypsum
Resinous	Sulphur
Silky	Asbestos
Greasy	Serpentine
Earthy	Kaolin

The prefix – “sub” is sometimes used when a characteristic is less clear.

**Colour:** Colour is the way a mineral looks on a freshly broken surface. In most metallic ores it is safe to identify this way, but often other minerals are coloured with impurities.

## Streak:

This is the colour of a mineral shown when rubbed against unglazed porcelain. It is often different to colour.

## Texture:

This is the character of a mineral’s surface.

## Crystal:

A crystal is a solid whose atoms, molecules, or ions are packed in a regularly ordered, repeating pattern extending in all three spatial dimensions. Snowflakes, diamonds, and common salt are common examples of crystals. (From Wikibooks)

## REQUIREMENT 6: Name four uses for rocks and four uses for minerals.

### Rocks

Pumice	cleaning (an abrasive)
Marble	building
Basalt	road making
Slate	roofing

### Minerals

Graphite	lubricants
Gypsum	plaster
Halite	preserving, flavouring (common salt)
Quartz	glass, T.V., gemstones (crystalline)

## **Rocks and Minerals Honour**

### **REQUIREMENT 7: Tell of four Bible incidents in which a rock was significant.**

David slew Goliath (1 Samuel 17:49)

Stone that smote the great image on the feet (Daniel 2:34,35)

Rock upon which the church is built (Matthew 16:18)

White stone with a new name (Revelation 2:17)

Also

The stone Moses smote for the water

The stone of help, Ebenezer,

The stone used as a pillow by Jacob

Stones used to make altars of sacrifice by the patriarch's especially Abraham's altars of witness.

### **REQUIREMENT 8: What are the foundation stones of the New Jerusalem?**

See Revelation 21:19.20

1. Jasper
2. Sapphire
3. Chalcedony
4. Emerald
5. Sardonyx
6. Sardius or Carnelian
7. Chrysolite or Olivine
8. Beryl
9. Topaz
10. Chrysoprase
11. Jacinth or reddish orange Zircon
12. Amethyst

### **REQUIREMENT 9: Discuss a rock or mineral that is significant in your area.**