

MINERAL IDENTIFICATION KEY - MineralCheck

WHAT IS A MINERAL?

- ✓ naturally occurring
- ✓ homogeneous solid
- ✓ inorganic
- ✓ chemical composition
- ✓ define atomic structure



WHAT IS A CRYSTAL?

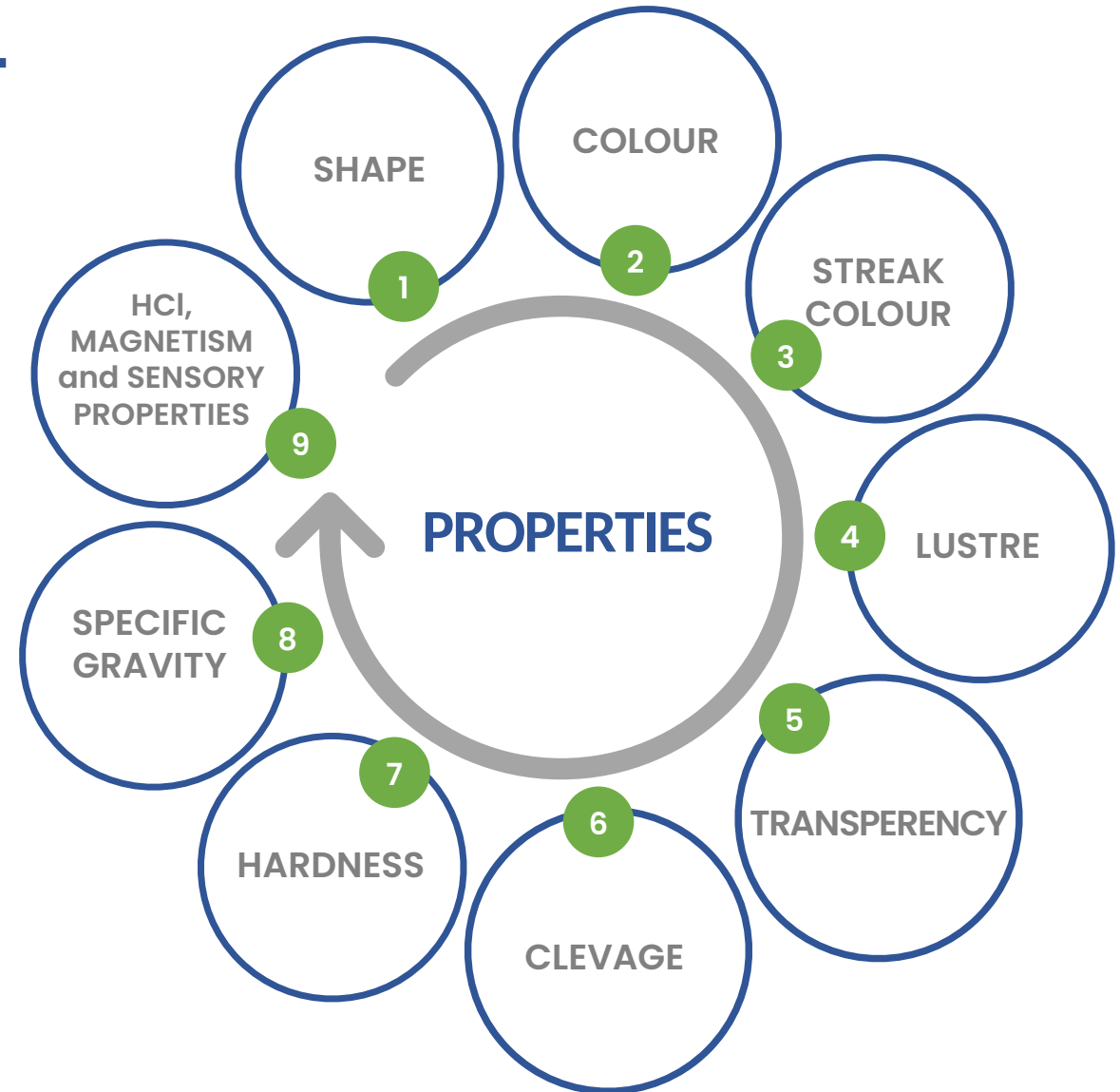
- ✓ geometric body
- ✓ ordered internal structure
- ✓ certain set of surfaces, edges and angles



PROPERTIES OF A MINERAL

The properties of minerals can be generally divided into:

- ✓ Properties related to the crystal structure
- ✓ Properties based on the interaction of minerals with light
- ✓ Mechanical properties
- ✓ Properties related to the mass of the mineral
- ✓ Other diagnostic properties



WHAT ARE MINERAL RESOURCES?

- It is a material **used in** the **production** of objects
- Mineral resources come from nature, they are **natural resources**
- We get them from **ores** ⇨ **minerals** that can be **extracted at a reasonable profit** (concentration or the occurrence of material that is of substantial economic importance)
- **Mines** are places where we extract ores lying **in or on the earth's crust**



CLASSIFICATION OF MINERAL RESOURCES

Classification of mineral resources according to the European Initiative on Mineral Resources:

- ✓ Native minerals
- ✓ Metallic minerals
- ✓ Industrial minerals
- ✓ Precious and semi-precious minerals
- ✓ Construction minerals



WHAT TO DO?

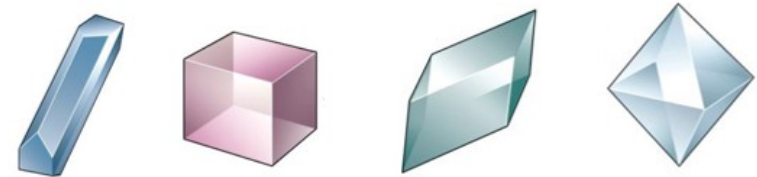
- ✓ Use teaching aids (Appendix 3) to describe properties of minerals on the worksheet (Appendix 2)

Appendix 2: WORKSHEET FOR DESCRIBING THE PROPERTIES OF MINERALS

PROPERTIES	Sample 1: (mark of the sample)	Sample 2: (mark of the sample)	Sample 3: (mark of the sample)
Describe the shape!			
Define the lustre!			
Describe the colour!			
Describe the streak colour!			

Appendix 3: TEACHING AIDS

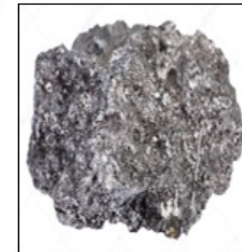
WITH GEOMETRIC FORMS
DESCRIBE THE MINERAL SHAPE!



WHAT LUSTRE HAS MINERAL?



NON-METALLIC



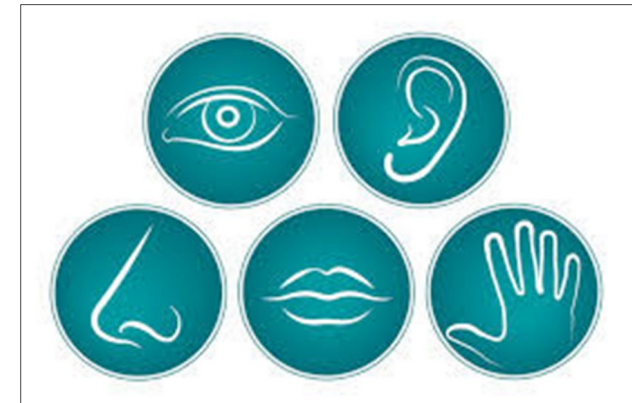
SEMI-METALLIC



METALLIC


HOW TO DO THE TESTS WITH GEOLOGICAL INVESTIGATION KIT?

- ✓ **Streak color**
- ✓ **Magnetism**
- ✓ **HCl reaction**
- ✓ **Sensory properties**
- ✓ **Hardness**
- ✓ **Specific gravity**



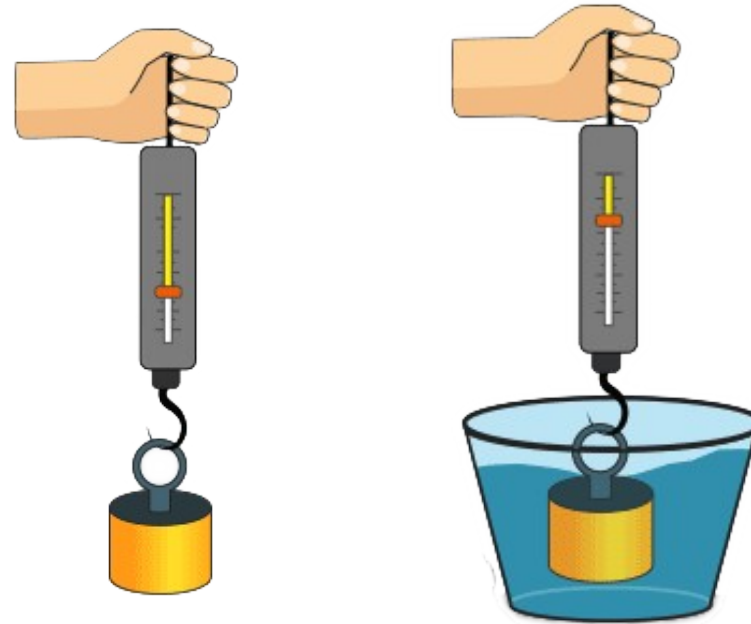
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- ✓ Streak color
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- ✓ **Hardness**
- ✓ Specific gravity

MOHSOVA HARDNESS SCALE		HARDNES OF COMMON EVERY DAY OBJECTS	
MINERAL	RELATIVE HARDNESS		
DIAMOND	10	Hardest mineral	
CORUNDUM	9	Cut glass	
TOPAZ	8	Cut glass	
QUARTZ	7	Cut glass	
ORTOKLAZE	6	Cut glass	
APATITE	5	Pocket knife leaves scratch	
FLUORITE	4	Nail leaves scratch	
CALCITE	3	Copper coin leaves scratch	
GYPSUM	2	Fingernail leaves scratch	
TALC	1	Fingernail leaves scratch	

HOW TO DO THE TESTS WITH GEOLOGICAL INVESTIGATION KIT?

- ✓ Streak color
- ✓ Magnetism
- ✓ HCl reaction
- ✓ Sensory properties
- ✓ Hardness
- ✓ **Specific gravity**



$$Spec. g. = \frac{\text{weight of object in air}}{(\text{weight of object in air}) - (\text{weight of object in water})}$$

WHAT TO DO?

- ✓ Answer questions in Mineral identification Key – MineralCheck (Appendix 4) and find the name and use of the mineral

MineralCheck - Table 1B:

Task 1: Determine the streak colour!

Task 2: Measure and calculate the specific gravity and compare it with lower table! Determine the name of your mineral.

MIN. / PROP.	FORMULA	CLASSIFICATION	CRYST. SHAPE	LUSTRE	COLOR	STREAK COLOR	TRANSPARANCY	CLEAVAGE	HARDNESS	SPEC. G.	MAGNETISM	REACTION WITH HCL	SENSORY PROPERTIES
CINABARITE	HgS	Metallic minerals	Rarely visible crystals; Elongated rectangle	Non-metallic, metallic	Red	Red brown	Transparent, translucent	Perfect	2-2½	8.17-8.19	No	No	Heavy
SPHALERITE	ZnS	Metallic minerals	Rhombus, common in strips	Non-metallic	Yellow, brown	Brown	Translucent, opaque	Perfect	3½-4	3.9 - 4.1	No	Yes	Cold feel, heavy
HEMATITE	Fe ₂ O ₃	Metallic minerals	Rarely visible crystals	Metallic, semi-metallic	Gray, black, red	Red brown	Translucent, opaque	Absent	5 - 6	5,26 - 5,3	No	Yes	Cold feel, heavy
GALENITE	PbS	Metallic minerals	Cube	Metallic	Gray	Gray	Opaque	Perfect	2½	7.57 – 7.6	No	Yes	Heavy

Note: Names marked with star (*) represent a group of related minerals, names marked with two stars (**) represent a mixture of different minerals.

Appendix 4: MINERAL IDENTIFICATION KEY - MINERALCHECK

STEP 1: Does the mineral have a metallic or semi-metallic lustre?

YES: Go to step 2

NO: Go to step 4

STEP 2: Does the mineral leave streak on the paper? (Hardness less than 2.5)

YES: Table 1A

NO: Go to step 3

STEP 3: Does the pocket knife leave a scratch on the mineral? (Hardness less than 5.5)

YES: Table 1B

NO: Table 1C

STEP 4: Does the mineral leave streak on the ceramic plate?

YES: Table 2A

NO: Go to step 5

STEP 5: Can you scratch the mineral with your fingernail? (Hardness less than 2,5)

YES: Go to step 6

NO: Go to step 7

STEP 6: Does the mineral exhibit cleavage?

YES: Table 2B-I

NO: Table 2B-II

STEP 7: Can mineral be scratch with copper coin? (Hardness less than 3,5)

YES: Go to step 8

NO: Go to step 9

USE OF MINERAL RESOURCES?

