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**PHYSICS**

**Task 4.1: Determination of relative humidity (moisture) of wood species, growing at different altitude above sea level**

**Relative humidity** of wood  — it is the ratio of the humidity weight in the wood and the weight of humid wood expressed as a percentage.

Aim: define if the humidity of a wood species depends on the growing altitude above the sea level

Integrated subjects: Biology, Chemistry, Geography, Physics.

Equipment: weight scale , microwave oven

Instructions:

1. Choose a wood species which grows at different altitude above sea level

My wood species is ……………………………………………..

1. Take 3 wood samples at every altitude above sea level (a branch of cylindrical form, length up to 10 cm) and mark every sample (E.g. A1S1 – altitude 1 sample 1)
2. Clean the bark
3. Measure the weight of humid wood samples (freshly cut) and record into table 1

Table 1 Weight of humid wood samples

|  |  |  |  |
| --- | --- | --- | --- |
|  | Weight of sample 1, m1(g-gramme) | Weight of sample 2, m2(g-gramme) | Weight of sample 3, m3(g-gramme) |
| Altitude 1 ………….m |  |  |  |
| Altitude 2 ………….m |  |  |  |
| Altitude 3 …………m |  |  |  |

1. Place the samples into the microwave for 15 minutes at 50% of maximum power.
2. After 15 minutes take the samples out of the microwave and measure the weight again. Record the data into table 2.

Table 2 Weight of dry wood samples

|  |  |  |  |
| --- | --- | --- | --- |
|  | Weight of sample 1, m1(g-gramme) | Weight of sample 2, m2(g-gramme) | Weight of sample 3, m3(g-gramme) |
| Altitude 1 ………….m |  |  |  |
| Altitude 2 ………….m |  |  |  |
| Altitude 3 …………m |  |  |  |

1. A) Calculate the relative humidity of wood samples using the formula:

$W=\frac{m\_{hum}-m\_{dry}}{m\_{hum}}∙100\%$, where

W- relative humidity of wood expressed as a percentage (%);

$m\_{hum}$ – weight of humid wood sample (g);

$m\_{dry} $– weight of dry wood sample (g);

Calculations:

B) Record the results into table 3

C) Calculate the average wood humidity for every altitude and record it into table 3

$$W\_{av}=\frac{w\_{1}+w\_{2}+w\_{3}}{3}$$

Table 3. Relative humidity of wood

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Relative humidity 1 of sample W1 (%) | Relative humidity 2 of sample W2 (%) | Relative humidity 3 of sample W3 (%) | Average relative humidity Wav (%) |
| Altitude 1 |  |  |  |  |
| Altitude 2 |  |  |  |  |
| Altitude 3 |  |  |  |  |

1. Based on the average data of relative wood humidity, conclude if humidity depends on the altitude of growing.

Comparison:

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Conclusion:

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