Working Sheet – What is this?

STM Picture



**Measurements & Calculations:**

1. **Measure the length of the picture:** \_\_\_\_\_\_ cm
2. **Calculate scale:**

2nm correspond to \_\_\_\_\_cm

1nm correspond to \_\_\_\_\_cm

1. **Measure the distance between 6-9 atoms (if possible), in 3 different directions:**

 \_\_\_\_\_\_\_cm; \_\_\_\_\_\_cm; \_\_\_\_\_\_cm

1. **Calculate atomic distance on print out:**

*(Distance (cm))* ***/*** *(number of atoms -1);*

for example: the distance between 8 atoms was measured to be 7cm:

7cm / (8-1) = 1 cm

Direction 1: \_\_\_\_\_cm / (\_\_-1) = \_\_\_\_\_\_ cm

Direction 2: \_\_\_\_\_cm / (\_\_-1) = \_\_\_\_\_\_ cm

Direction 3: \_\_\_\_\_cm / (\_\_-1) = \_\_\_\_\_\_ cm

Mean value: (\_\_\_\_\_cm + \_\_\_\_\_cm + \_\_\_\_\_cm) / 3 = \_\_\_\_\_cm

1. **Calculate atomic distance in real (in nm; include the scale from nb. 2)**

From nb. 4: atomic distance on print out: \_\_\_\_\_\_\_cm

From nb. 2: scale: 1nm correspond to \_\_\_\_\_\_\_cm

Atomic distance / scale = scaled atomic distance = \_\_\_\_\_ nm

**Answer: The atomic distance seems to be \_\_\_\_\_\_nm**

1. **Read the following definitions. Search for more information in google, if necessary.**
* **Atomic distance:** is the distance between the two closest neighbours in a crystal
* **Lattice constant:** refers to the physical dimension of [unit cells](https://en.wikipedia.org/wiki/Unit_cell) in a [crystal lattice](https://en.wikipedia.org/wiki/Crystal_lattice)
* **Unit cell:** repeating pattern in a crystal structure





1. Collect further information, like atomic structure, atomic distance, lattice constant etc. of the following 4 substrates:
	1. Molybdeneum Disulfite
	2. Sicilcon
	3. Graphite
	4. Graphene
2. Decide using your calculations and the further information from above, which of the 4 substrates from nb. 7 is shown in the STM picture.