Paper Wrinkles

Indonesia

5th IYNT 2017

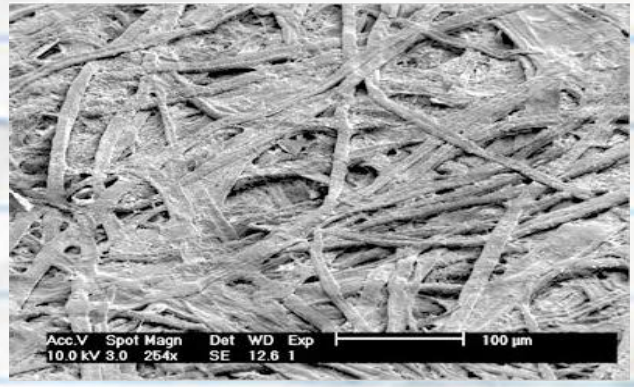
Problem

Paper wrinkles

- When a piece of paper dries after being wet, it can get wrinkled. Investigate and explain this phenomenon.

Why do paper wrinkle?

- Paper is a solid, so it has a dense particle formation.
- Wetting the paper opens its particle structure, and separates its fibers.
- Since paper is not elastic, this new particle and fiber formation is locked in as water leaves the paper.



Experiment I

- Find out: If the method used to apply liquid onto the paper affects wrinkles.
- Variable tested: - Application of liquid (includes amount of liquid used)
- Constant variables: - Type of paper - Type of liquid
  - Size of paper - Method of drying
  - Weight of paper
- Materials: 1. Paper (A4, 70 gr, 6pc) 4. Small container
  2. Liquid (tap water) 5. Dropper
  3. A place to hang samples 6. Paintbrush

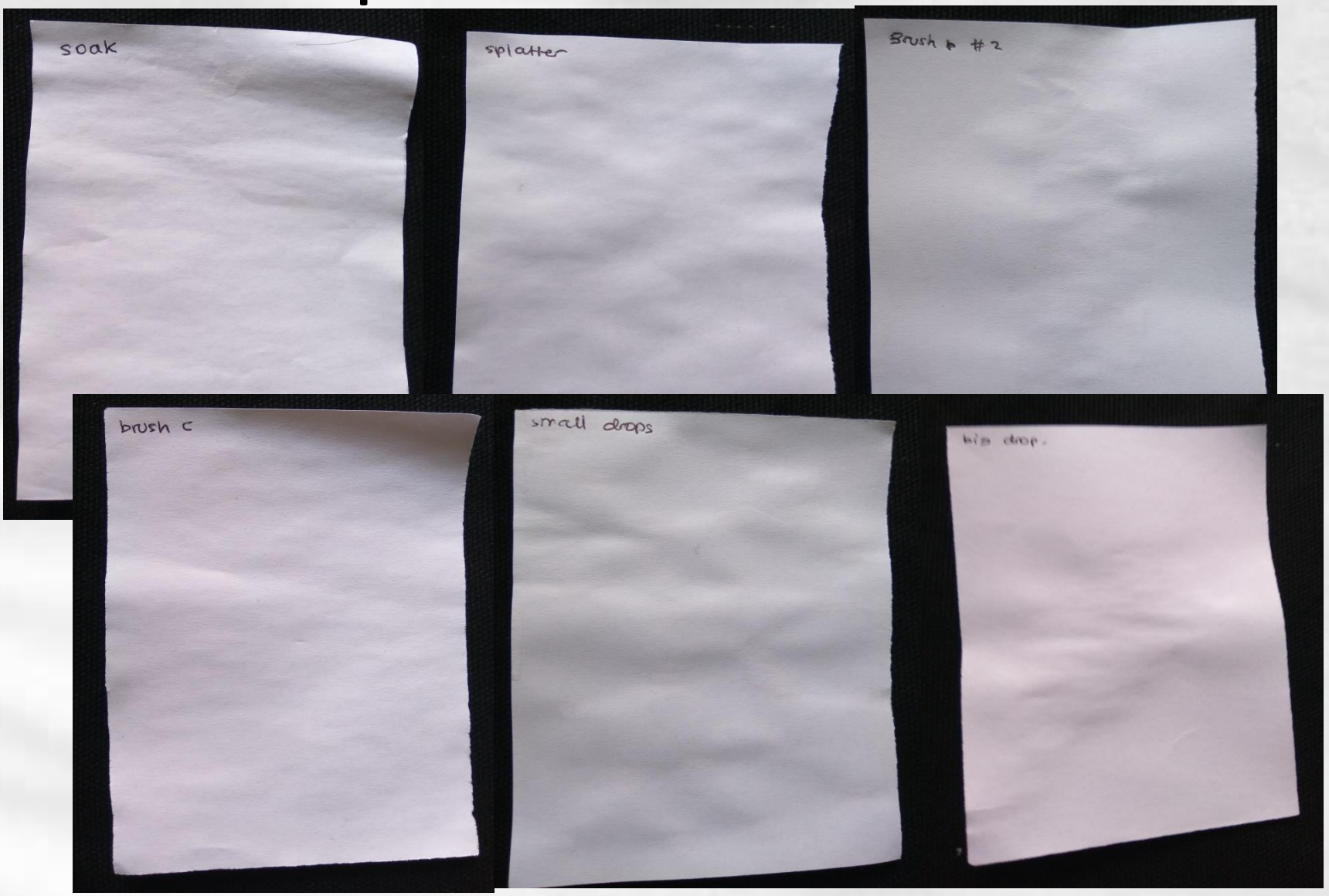
Experiment I

- Methods: 1. Soak
  2. Splatter
  3. Applied with brush (partial and completely)*
  4. Applied drop by drop (small drops and big drop)*
- Procedure:
  1. Fill container with water and soak the paper until completely wet. Hang to dry.
  2. Wet your hands and splash the water onto another paper. Hang to dry.
  3. Wet paintbrush and brush it across the paper once. Hang to dry.

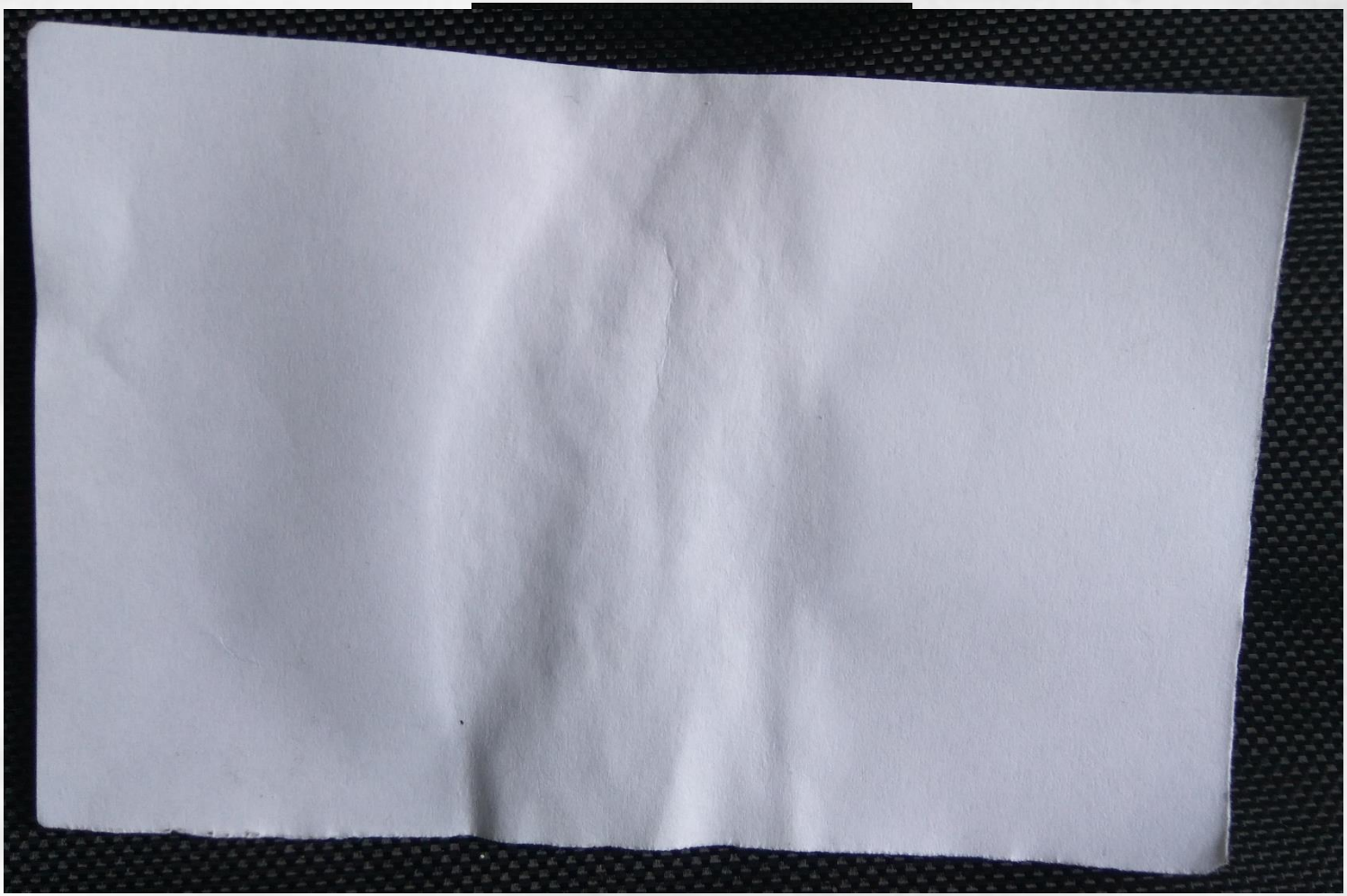
Experiment I

- Procedure:
  4. Repeat step 3, but instead of one stroke, keep brushing the paper until completely wet.
  5. Fill dropper with water and drip small water droplets all over the paper. Put on a flat surface to dry.
  6. Repeat number 5, but instead of small droplets, put a big one in the middle of the paper.
  7. Observe what happens to each paper.

Experiment I - Results



Experiment I - Conclusion



Experiment II

- Find out: If the type of liquid applied onto the paper affects wrinkles.
- Variable tested: - Type of liquid
- Constant variables: - Type of paper - Amount of liquid
  - Size of paper - Method of drying
  - Weight of paper - Liquid application
- Materials: 1. Paper (A4, 70 gr, 5pc 10x8cm)
  2. Liquid (tap water, oil, perfume, sugar water, arcylic mixture,)
  3. A place to hang samples
  4. Small containers

Experiment II

- Liquids: 1. Tap water
  2. Perfume
  3. Oil
  4. Sugar water
  5. Arcylic + tap water mixture
- Procedure:
  1. Fill each container with liquids above.
  2. Soak pieces of paper completely in each liquid, drain excess liquid.
  3. Hang to dry *pokoknya cara taro airnya pake yg paling efektif di eksperimen I*
  4. Observe what happens to each paper.

Experiment II - Results

Foto

Tap water		**Cold water**	
Alcohol		**Arcylic mixture**	
Hot water		**Watercolour mixture**	

Experiment III

- Find out: If the drying technique affects wrinkles.
- Variable tested: - Method of drying
- Constant variables: - Type of paper - Amount of liquid
  - Size of paper - Type of liquid
  - Weight of paper - Liquid application
- Materials: 1. Paper (A4, 70 gr, 4pc 10x8 cm)
  2. Liquid (tap water)
  3. A place to hang samples
  4. Open space (indoor + outdoor)
  5. Fridge
  6. Hairdryer

Experiment III

- Method of drying: 1. Room temperature (26◦C)
  2. Fridge (4◦C)
  3. Sun
  4. Hairdryer
- Procedure:
  1. Soak each piece of paper completely in water.
  2. Place/ hang each wet paper in one environment (hairdryer method is done separately)
  3. Observe what happens to each paper.

Experiment III - Results

foto

Room Temperature		**Sun**	
Fridge		**Hairdryer**	

Final Conclusion