livMatS

UNI FREIBURG

Participate in Science

The Spaghetti Experiment

Hello!

I'm happy to have your support as a researcher in this experiment!

Together with you, I want to find out exactly how raw spaghetti breaks, and whether this depends on how fast you bend it or how long it is. This knowledge can later help to develop new materials that are at the same time particularly strong and particularly light.

If we manage to collect enough measurements, I will publish our data in a scientific publication. Such publications are very important in science, because through them researchers exchange information with each other and share their results with everyone. In the publication, you will be named as part of the "Spaghetti Collaboration" - then it is quite official that you have been involved in the research.

Please read closely the instructions below and write down your readings carefully, because accuracy is very important in science.

I'm excited to see what we find out!

Best regards,

Slava

Dr. Viacheslav (Slava) Slesarenko
conducts research on materials that have special properties due to their structure

What you need:

- [ ] Packet of spaghetti
- [ ] Ruler, set square, or caliper to measure with
- [ ] Table for entering the measured values (download here (hier herunterladen: https://www.livmats.uni-freiburg.de/events/spaghetti)
- [ ] Felt-tip pen
- [ ] Computer with internet access to upload the data
- [ ] Camera (it also works without)

Experiment Instructions

Step 1: Preparation

Just like in a science lab, you must first prepare your workspace:

On your table should be only the things you need for the experiment. If your table isn't right up against the wall, place a book or binder upright in front of you so the spaghetti fragments don't fly off too far afterward.

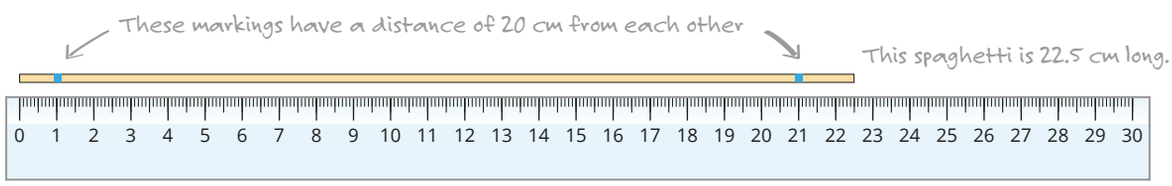
Then prepare the table for entering the measured values. You can fill it out directly on the computer or print it out and then enter them on the computer. Don't forget to save in between if you fill it out digitally. Start with the upper fields:

- Write down your name and whether you are right- or left-handed.
- Write down the brand of spaghetti and the name of the variety. It is also best to take a photo. You can upload the photo later together with your measurements.
- If you can measure very accurately, also enter the diameter, or thickness, of a single spaghetti.

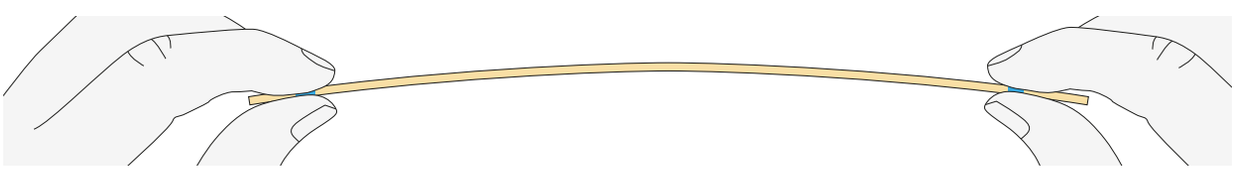
Step 2: The Experiment

Now it's time for the real measurements! Repeat the next steps as often as possible, at least 30 times, and enter the measured values in the lower part of the data template.

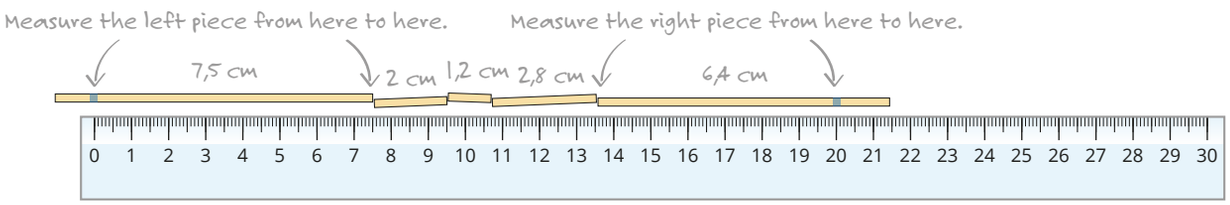
- Take a single spaghetti and measure its total length in centimeters (cm). Enter the length in the list.
- Mark two spots on the spaghetti with a pencil, either 10 or 20 cm apart. Write down which distance you have chosen. About half of your measurements should be taken with 10 cm spacing, and about the other half with 20 cm spacing.



- Now take the spaghetti in both hands and place your fingertips exactly at the marks.
- Decide whether you want to break the spaghetti in a fast or slow motion and bend it quickly or slowly accordingly. Keep your fingers on the marks. Try not to lose sight of the flying fragments.



- Now collect all the parts again and put them back in their original order as far as possible. Enter the number of all parts in the table.
- Then measure the length of each piece. Enter it in the list from left to right. Important: Measure the length of the end pieces only between the mark and the breaking point, not all the way from the end.



It is especially important that you write down the measured values carefully. This is not only the case here, but also for all scientific experiments.

For example, after the first few tries, your table may look like this:

Nummer	Länge ganze Spaghetti	10 oder 20 cm Abstand beim Brechen?	Schnell oder langsam gebogen?	Anzahl Bruch-stücke	Länge der Bruchstücke, sortiert von links nach rechts. Bei den End-stücken nur zwischen Markierung und Bruchstelle messen. Schreibe in die leer bleibenden Felder eine Null.							Summe der Länge aller Bruchstücke	Reihenfolge links - rechts sicher richtig?	Kommen (falls du
1	22,5	20	schnell	5	7,5	2	1,2	2,8	6,4	0	0	19,9	ja	
2	22	10	langsam	3	5	0,5	4,6	0	0	0	0	10,1	ja	
3														

Step 3: Send Data

When you have often repeated step 2, go upload your list with the results on this website:

https://www.livmats.uni-freiburg.de/events/spaghetti/messwerte

Thank you for participating!

INFO

As a Cluster of Excellence at the University of Freiburg, *liv*MatS develops life-like material systems that are inspired by nature. The systems are intended to be as robust as conventional materials, but able to adapt to external conditions in a similar way to plants and animals. The material systems obtain the energy needed for this from the environment, for example from sunlight.

Living, Adaptive and Energy-autonomous Materials Systems

www.livmats.uni-freiburg.de