Worksheet - Background - Instruction

basics about scientific experimenting and documenting

# Why is it important to read before you act?

When it comes to experimenting, some of you would like to get started right away. In the presentation, we've linked you to a [video](https://www.youtube.com/watch?v=Ct-lOOUqmyY) in which two younger children have written "precise" instructions for their father to make a peanut butter sandwich. As you might expect, it always goes wrong. It can be funny. But you can also see in the video that the younger son is pretty annoyed and upset. He finally wants success! That's the way it is with planning. Excessive planning destroys all joy and especially laughter about mishaps or strange results. Therefore, find the right measure for it. Dare to just "do it". Nothing can go wrong. The experiments and experiences are all safe.

# Learn more about scientific work

If you understand how good and [serious scientists work](https://www.youtube.com/watch?v=vNDYUlxNIAA), you can judge how to evaluate the results of [scientific research](https://www.youtube.com/watch?v=qQBZbinoOrI): Was there a control group or control experiment? How was the evaluation done? How was the data collected and analyzed? If you take experimentation seriously, you will be able to ask critical questions later during the interviews. Maybe because an argument does not convince you. Or because you don't believe the numbers that are presented. It is also important for the stories you are supposed to tell after the experimentation that you have all the facts ready, i.e. well and cleanly documented. Asking the right questions is also called the [Socratic method](https://www.youtube.com/watch?v=vNDYUlxNIAA). If you are interested in this philosophical approach to the discussion of scientific topics, you should watch the short comic video about Socrates and his questioning of facts.

# Why is a “prepared environment" so important for experimenting?

Who cleans up is just too lazy to look? A German proverb. Unfortunately not helpful when experimenting. Are you more of an improviser? Or you call yourself a "doer". Or do you approach things deliberately, planning exactly what you want to do in advance? If you want to experiment scientifically, you need something like a road map to guide you to your destination. If you have a goal. For example, going to a music festival. To stay in the picture. It wouldn't be good if you didn't take a break when the area looked very inviting, just because it wasn't intended. And it would also be a shame if you didn't treat yourself to a trip to a friend's house who surprises you with a coffee. It's just stupid if you miss the concert because it's too late!

Therefore we advice:

* Read the instructions for the planned experiments beforehand.
* Plan an extra time of about 50 % as a precaution. This is a rule of thumb: most of the time, everything takes twice as long as expected or planned! If you do this, you will know realistically how many experiments you can do in one session.
* Get all the materials or ingredients that are listed.
* Find the right mix: sufficient planning, but not slavishly sticking to the plan. Be curious and open to the unexpected, but don't lose sight of the goal.

# Research before you replace it!

Any good cook can substitute ingredients if he wants to vary the recipe, for example, due to the season not available at the moment. But he has to know his stuff. For example, replacing one type of pasta with another works in most cases. Also the pasta shape has an impact on the absorption of sauce. But substituting less common spices like cardamom requires a little research if the flavor result is to be similar. It's much the same with the experiments. Do your research beforehand if you want to make changes in materials!