School Lessons with Pritt

These materials are part of the Researchers' World education initiative.The teaching concept and program were developed under the guidance of Prof. Dr. Katrin Sommer, Chair of Chemistry Didactics at Ruhr University Bochum, Germany, with the support of Henkel adhesive experts. The experiment is suitable for third or fourth grade students.

Lesson 2: Natural raw materials for adhesives

Materials needed

- 4 small containers for the powder samples, e.g. small beakers
- Marker pen for writing on the beakers
- 1 water cup
- 2-4 disposable pipettes
- 4 watch dishes (small glass dishes) or alternatively 4 jelly jar lids
- Paper for the tests (optional)
- Sugar, baking soda, salt, cornstarch or similar samples

Part 1: Assigning the adhesives from Lesson 1

It is advisable to go over the discussion and evaluation of the results from the first double period (Lesson 1) at the start of the second double period. The anonymized adhesives still need to be assigned to the correct adhesive categories. The students should use the results from their adhesive tests to do so and should give reasons.

At the end, it is revealed which adhesive matches which number. It may turn out that the results of the adhesive tests are not as good as they should have been. Contradictory results can be explained by the fact that adhesives need to be applied in different ways to effectively develop their adhesive strength. You can read through the instructions on the original packaging with the students and compare them with the students' own procedure.

Part 2: “What is sticky and what isn’t”

The focus of the next few classes is on a particular adhesive: the glue stick (Pritt). The aim is to use experiments to show the students the whole process, from the raw material and the ingredients in the glue stick substance to the finished glue stick. The first question for the students is: What can be used to make an adhesive?

Students know from everyday life that their hands become sticky when they eat candy. There are a number of substances in the kitchen that, sometimes quite accidentally, stick to everything. Pudding powder, for example, is one of these substances.

This experience can be used to introduce the students to a preliminary experiment with a substance that has a place both in the kitchen and in adhesive production: starch. In the preliminary experiment, the students are given four similar looking powders to investigate. The powders are assigned a number; the students do not know what these numbers stand for.

Their task is to test which of the powders can be mixed with water to produce a sticky substance that could perhaps be suitable as a raw material for an adhesive. The students can rub the stirred mixtures between their fingertips so that they feel what is sticky and what isn’t.

Conclusions

It is highly likely that the students will discover that the combination of water and cornstarch is the stickiest.

Worksheets for students

Name:

Team:

Lesson 2: What is sticky and what isn't?

You would like to make your own adhesive. But what could an adhesive be made from? You have often had sticky hands – when you have eaten something sticky, for example.

Give a few examples of food that can be sticky:

Find out which of the four powders you might use to make an adhesive.

You find four similar-looking powders in the kitchen. What happens if you mix them with water, as you do with pudding powder for example? Could the powders produce a sticky substance when they are mixed with water?

Now work in a group. Each group is given four small beakers containing powders that are numbered 1 through 4. You will also need small glass dishes (watch glass dishes), spatulas, a water container and disposable pipettes.

1. Put two spatula tips of powder #1 into the glass dish. Use the pipette to add water drop by drop and stir the mixture with the spatula. How does it behave?

2. You can also rub the mixture between your fingertips. Do they get sticky?

Record your observations:

	Does not become at all sticky when mixed with water and stirred	Becomes a little sticky when mixed with water and stirred	Becomes sticky when mixed with water and stirred
Powder no. 1			
Powder no. 2			
Powder no. 3			
Powder no. 4			

Result: Powder _____ produces the stickiest mixture when it is mixed with water and stirred.