

ADHESIVES

A STICKY STORY

STICK TO THE BASICS

Sticky stuff can be great fun to experiment with, or it can cause one a head ache if it does not want to work well.

Lots of things you use every day are made with adhesives: envelopes, stamps, stickers, food packaging, tape and plaster you put over a cut. Certain toys and some sports equipment are held together with adhesives. Even in jet planes, cars, huge bridges and buildings adhesives are used to hold important parts together.

Materials like glue, paste, and sticky tape are called adhesives because they make things stick together, or adhere to each other. For an adhesive to work, it must stick well to both materials you want to stick together. If you use paste to stick a feather to a piece of cardboard, the paste must stick to the feather and the cardboard. If you use tape to stick a balloon to the wall, the tape must stick to the balloon and to the wall. What makes glue, paste, or tape stick to things?

Wood, paper and many other materials have tiny cracks and holes in them that are so small you can not see them without a magnifying glass or microscope. When you glue these materials together, the glue seeps into their tiny openings and then hardens so that the materials get stuck together.

Sometimes the molecules in an adhesive and the molecules in the thing being glued get tangled together and are hard to get apart, or they may have a chemical reaction and get stuck together.

Most adhesives are made with a specific purpose. They stick to some things better than to others. Some glues work well with paper or wood, but not with plastic or glass. If you look on the label of a container of glue, it will tell you the different things to which it can stick.

MAKE YOUR OWN STICKY-O-METER

You will need:

- ◆ One large plastic or pressed foam cup
- ◆ Five smaller pressed foam cups
- ◆ Ruler
- ◆ String
- ◆ Honey
- ◆ Peanut butter
- ◆ Jam
- ◆ Spoon
- ◆ Tape
- ◆ Five-cent coins
- ◆ Aluminium foil
- ◆ Plastic wrap
- ◆ Four small paper plates
- ◆ Pencil



Cover your work surface with a double layer of paper towels or newspaper. Turn the large cup upside down on the table. Balance the ruler on the cup.

Make a handle for one of the smaller cups out of string by taping the two ends of a piece of string to opposite sides of the cup near the rim. Note: The handle should be long enough so that the bottom of the cup touches the table when the handle is placed over one end of the balanced ruler.

Make a shorter string handle for another cup. Tape the two ends of a piece of string to this cup so that it will be about 8 cm off the table when the handle is placed over the other end of the balanced ruler.

Hang the cups from opposite ends of the ruler and tape each cup handle to the ruler to hold the handles in place. Put a small paper plate under the cup with the long handle.

Using a spoon, smear a layer of honey on the bottom of the long-handled cup and push the cup down onto the plate. Lay a pencil on top of the cup and underneath the centre of the ruler.

Ask a friend to hold down the paper plate while you begin to put coins, one at a time, into the cup. When the honey cup pulls away from the plate, count the coins in the cup and record the number on the chart.

Now cover the plate with aluminium foil. Put the same amount of honey on the bottom of the cup as you used the first time. Stick the cup to the aluminium foil and start adding coins to the other cup. When the honey cup becomes "unglued", record the number of coins in the chart. If the number of coins is different than before, is the bond between the cup and aluminium foil stronger or weaker than the bond between the cup and the paper plate?

Now cover the plate with plastic wrap. Put the same amount of honey on the cup and stick the cup to the plastic. Add coins again until the cup becomes "unglued". Record the number of coins in the chart. When using honey as the adhesive, to which material does the cup form the strongest bond: paper, aluminium, or plastic?

Repeat your experiment using jam and peanut butter as you did with the honey to see which one forms the strongest bond between the cup and the paper. NOTE: You will need a different cup and a new paper plate for each different "food glue".

You can try to mix some of your food glues together to see which mixture forms the stickiest glue by using your sticky-o-meter.



TERRIFIC, TACKY TAPE

You will need:

- ◆ Two hard-back chairs of the same height
- ◆ Two plastic rulers
- ◆ Cellophane tape (about 1.3mm wide)
- ◆ Masking tape (about 1.3mm wide)
- ◆ White first-aid tape (about 1.3 mm wide)
- ◆ Three small plastic sandwich bags
- ◆ Aluminium foil
- ◆ Newspaper
- ◆ Blunt-tip scissors
- ◆ Five-cent coins

Place two chairs back to back. Support a ruler on the backs of the chairs so that the numbers of the ruler are facing the floor. Cut a 15 cm piece of each type of tape. If any piece of the tape is not the correct width, trim it so that it is about 1.3 mm wide. Tape 5 cm of one of the tapes to the open end of a plastic bag so that the bag hangs open when you hold the top of the tape. Tape exactly 2.5 cm of the other end of the tape to the surface of the ruler facing the floor. Start by putting coins, one at a time, in the plastic bag until the tape pulls off from the bottom of the ruler. Count the coins in the bag and record the number on the chart. Repeat steps 3 and 4 with the different tapes and see which tape sticks longest to the ruler. Make sure you place the coins into the bag at the same rate for each experiment. Wrap the ruler with a piece of newspaper and repeat the steps to see which tape sticks best to newspaper. Note: Use your other ruler to be sure to stick exactly 2.5 cm of tape to the newspaper as you did with the bare ruler. Why do you want to stick the same length of tape to the ruler each time? Wrap the ruler with aluminium foil. Repeat the steps of the experiment to see how well each tape sticks to aluminium foil. Record your results.

	NUMBER OF COINS		
	Honey	Jam	Peanut butter
Paper plate			
Aluminium foil			
Plastic wrap			



	NUMBER OF COINS		
	Plastic ruler	Newspaper	Aluminium foil
First-aid tape			
Cellophane tape			
Masking tape			

MAKE A HIT WITH A PIÑATA

What is a piñata?
Piñatas are from Mexico, the country just south of the United States of America. In the olden days, Mexicans made piñatas from decorated clay jars and filled them with sweets, fruit and gifts for their Christmas celebrations. The piñatas were hung overhead and children wearing blindfolds would try to break them open with a stick to get the prizes inside.

Today, piñatas are usually made from papier mâché (strips of paper dipped in paste and allowed to dry and harden) but are still filled with sweets and prizes and decorated in beautiful colours.

- You will need:**
- ◆ 1/2 cup flour
 - ◆ 1 cup water
 - ◆ bowl
 - ◆ newspaper
 - ◆ spoon
 - ◆ balloons (inflated)
 - ◆ crepe paper

Pour the flour and water into a bowl and mix with a spoon until the paste is smooth.

Tear the newspaper into strips about 5 cm wide and between 15 cm and 30 cm long. Dip the newspaper strips all the way into the paste and then pull the strips between your fingers to wipe off the extra paste.

Lay the pasted newspaper strips on the balloon. You can attach different kinds of balloons together to make piñatas with different shapes. Keep adding your papier mâché strips until the balloons are almost completely covered. Leave a small part of the balloon uncovered so that you can pop the balloon when the papier mâché is dry to create a hollow piñata that you can fill with sweets and prizes.

Let your piñata dry (about two to three days). Use colourful crepe paper with tape of glue to decorate your piñata! You can save your piñata for your birthday party and hang it as a decoration. Your friends can then break it open for the prizes inside.



STICKY RIDDLES

Many adhesives we use every day are made in factories, but there are also many adhesives that occur in nature and have their own important uses for plants and animals. Read these riddles and pick the picture that best answers the riddle.

1. I stick to boats and ships and rocks
And underneath the rusty docks.
 2. Down your drainpipe I can glide
Along my sticky, slimy slide.
 3. With every sticky thread I weave
There's one more guest who cannot leave.
 4. Dirt and mud and sticky stuff
For my nest, that's enough.
 5. To make sticky honey
Takes hours and hours of collecting nectar
From my favourite flowers.
- Write your own riddle about the sticky tongue a chameleon shoots out of its mouth to catch insects.



1. Barnacles
2. Slug
3. Spider
4. Wasp/hornet

I SEE SCIENCE

The organisers are really excited about the interest young photographers showed in the first round of the SAASTA I See Science photography competition. Entries were received from all over the country. The five winners each received a digital camera as prize. The winners are:

First prize:

*BERENICE TOM,
CAPE TOWN*

*TITLE OF IMAGE:
LIFE TOUCHED BY
SCIENCE*

*What it shows: A
hand touching a
sheet of glass
with phosphorous
gases trapped
beneath at the
MTN ScienCentre
in Cape Town.*



Second:

JULIE FURTER, EAST LONDON

TITLE OF IMAGE: WHERE AM I?

What it shows: A long exposure of a person, zooming in.



Third:

ELSIE MATJEKE, MAKWELERENG, LIMPOPO

TITLE OF IMAGE: OUR SCIENCE CENTRE

What it shows: The health science, maths and technology centre of Mosesane Baloyi School which was constructed from the panels of an old bus.

Highly commended:

Lamlela Plaatjie, Milnerton (Left)

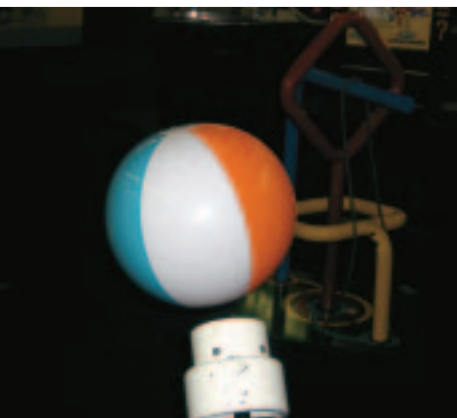
TITLE: SEEING IS BELIEVING

What it shows: Air blown from a pipe is making this ball float and defy gravity. It is called the Bernoulli Principle.

Martin Trollip, Roodepoort (Right)

TITLE: HARD DRIVE FROM THE INSIDE

What it shows: The arm of the hard drive of a computer that moves over the platter to read stored information.



An exhibition of prints of the prize-winning and highly commended entries will be touring science centres

across the country. Be sure to catch it when it comes to a centre near you. For more information on the competition,

visit the website:
www.saasta.ac.za/sciencelens

MARK NATIONAL SCIENCE WEEK IN YOUR DIARY!

The Department of Science & Technology is calling on you to mark 13 to 20 May 2006 when the annual National Science Week will take place. Preparations are in full swing to ensure that this week is celebrated across South Africa. This year's theme is: Tomorrow's science and technology are in our youth's hands. For more information on NSW events and activities, contact the South African Agency for Science and Technology Advancement (SAASTA) on (012) 392 9300 or visit the website (www.saasta.ac.za).

AFRICA-JAPAN SPEECH AND ESSAY COMPETITION

Hurry! Enter the Africa-Japan Speech and Essay Competition between high school learners and tertiary students from South Africa, Zambia and Japan and you stand a chance to win a trip to Japan, a Canon camera, and more! The closing date for essays is 26 May 2006. Visit the SAASTA website (www.saasta.ac.za) for more information, or phone us at (012) 392 9300.