

See DNA

How is DNA used to make tiny things?

Description

In this activity, kids extract DNA from wheat germ.

Suitable for kids ages 5 and up.



Materials

Isopropyl alcohol (rubbing alcohol)
Hot water
Raw wheat germ
Detergent
(dishwashing liquid or shampoo)
Meat tenderizer (optional)
Small cup or bowl for mixing ingredients
Regular spoon
Small, transparent glass for observing DNA
(a shot glass works well)
Bamboo skewers or wooden craft sticks
Eyedropper (optional)



Notes: Raw wheat germ is available in grocery stores. If you can find 90% isopropyl alcohol (rather than 70%), it works better.

Time

Advance preparation: 5 minutes
(beginning several hours ahead of time)

Preparation: 15 minutes

Activity: 15 minutes

Cleanup: 5 minutes

Safety

Do not eat or drink any of the materials used in this activity. Supervise children at all times.

Step 1

Grown-ups, put the alcohol in the refrigerator to cool several hours before starting the activity.



Step 2

Grown-ups, prepare the wheat germ mixture 20 minutes before starting the activity.

Put $\frac{1}{2}$ cup hot water in your mixing container. Add 1 spoon wheat germ, $\frac{1}{2}$ spoon detergent, and $\frac{1}{2}$ spoon meat tenderizer (optional).

Stir well. Let mixture settle for 15 min.



Step 3

Kids, let's extract DNA!

Use a spoon (or an eyedropper) to put around half an inch of wheat germ liquid in the bottom of your glass.

Try to get just the liquid from the top of the glass, and none of the gunk at the bottom.



Step 4

Carefully pour about the same amount of alcohol into the glass, making a separate layer on top of the wheat germ liquid.

TIP

To add the alcohol gently, you can tilt the glass slightly and pour the alcohol down the side. Younger children may need help with this step.



Step 5

Gently rock or swirl the glass.

Look inside. Can you see anything forming in the layer of alcohol?

TIP

Don't be too rough while you rock the cup— you don't want the two layers to mix.



What's going on?

That white, slimy stuff you see is DNA! By adding the alcohol to the wheat germ, you made the DNA clump together.

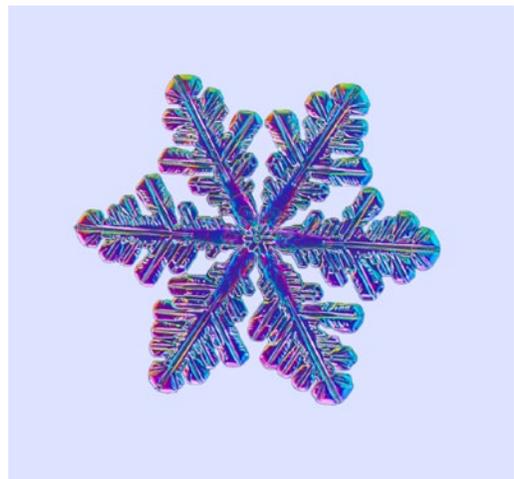
DNA is in every plant and animal cell. It helps cells to grow and do their jobs. DNA is an example of the way things in nature build themselves, or *self-assemble*.



How is this nano?

Self-assembly is a process by which molecules and cells form themselves into functional structures.

Self-assembly occurs in nature—snowflakes, soap bubbles, and DNA are just three examples of things that build themselves.

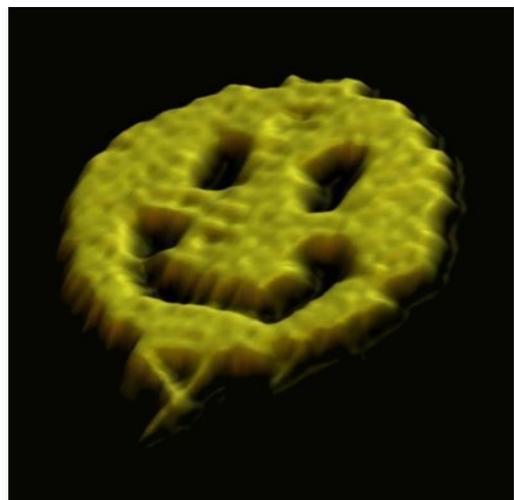


DNA nanotechnology

Nanotechnology takes advantage of the way things behave differently at the nanoscale to make new products and applications.

Researchers in the field of nanotechnology are using materials that self-assemble—like DNA—to create new materials and technologies smaller than 100 nanometers in size. (A nanometer is a billionth of a meter.)

A researcher at Cal Tech got DNA to fold itself up into a nano-sized smiley face!



Smiley face made out of DNA

Learn more

Learn more at:

www.whatisnano.org



Credits



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