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# Exploring Structures—DNA

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*How do you extract DNA?*



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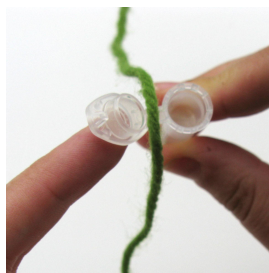
## Exploring Structures—DNA

### Try this!

1. Use a pipette to add a squirt of wheat germ liquid into a plastic tube. Fill it halfway.

*Tip: Be sure not to get wheat germ solids in the pipette!*

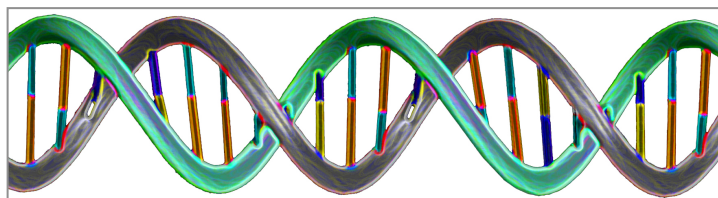
2. Use the dropper bottle to add alcohol to the tube. Fill it almost all the way to the top.
3. Put a piece of yarn over the edge of the cap, and snap it shut.
4. Gently rock the tube a few times, and look inside. Can you see anything forming in the tube?
5. Tie the yarn—you have a DNA necklace!



### What's going on?

That white, slimy stuff you see is DNA! When you added 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*.



**DNA**  
2 nm wide

### How is this nano?



**Smiley face made of DNA**  
100 nm wide

**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.

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.)

For example, at Cal Tech a researcher got DNA to fold itself up into a nano-sized smiley face! And at Arizona State University, scientists built a nano-sized spider robot that can walk along a sheet of folded-up DNA.

