# Lesson Plan

## Focus on Super-Small Stuff

**Book:** *All About Nanotechnology*
**Series:** Cutting-Edge Technology
**Level:** Navigator

### Objective

To help students combine information from a book and an online article to fill blanks in sentences about nanotechnology and its uses.

### Supplies

- *All About Nanotechnology* book
- "What Is Nanotechnology?" article from Wonderopolis: https://wonderopolis.org/wonder/what-is-nanotechnology
- Super-Small Stuff worksheet (attached)
- Pencils

### Before the Activity

Read the *All About Nanotechnology* book, or assign it to students to read on their own. Print a copy of the Super-Small Stuff worksheet for each student.

### Activity

Nanotechnology involves working with extremely small machines and materials. To help students learn more about these tiny things and their uses, pull up the "What Is Nanotechnology?" article in your web browser. Read this article out loud as a class, choosing a different student to read each paragraph. Then pass out the Super-Small Stuff worksheet. Students should use what they learned from the book and the online article to fill in the blanks on this worksheet. Keep a copy of the book on your desk so students can look through it if they get stuck.

### Evaluation

Collect the worksheet and use the attached answer key to give each student 1 point for each correct answer, for up to 24 points total. Note that some blanks have more than one possible answer, depending on whether students use the wording from the book or the online article.

### Standards

This lesson may be used to address the Common Core State Standards' reading standards for informational text, grade 5 (RI 5.7, 5.9), and the National Science Education Standards' Content Standard F, grades 5–8.

# Super-Small Stuff

1. Nanotechnology is used to describe things that are made and _____ that are done at the _____.

2. The nanoscale uses units called _____. A single one of these tiny units is equal to _____ of a meter.

3. Nanoparticles are tiny bits of matter that are between _____ and _____ nanometers.

4. _____ from when nanoparticles join together.

5. The _____ was invented in 1981. It allowed scientists to see _____.

6. The _____ was created in 1986. It worked for more materials because it didn't need to use _____.

7. _____ are round, hollow nanoparticles made from carbon.

8. Scientists make _____ by rolling a sheet of graphite molecules into a tube.

9. _____ is a sheet of carbon that is one atom thick.

10. _____ are tiny machines that could be injected into people's bodies to give medical care.

11. Some sunscreens contain nanoparticles of _____. These particles make the sunscreen _____.

12. _____ can keep eyeglasses from fogging up. They can also prevent things from sticking to _____ or _____.

13. Adding _____ to medicines can help them attack _____ so people don't feel as sick.

14. Some _____ contain silver nanoparticles. These nanoparticles have ions that kill _____ and keep clothes from stinking.

# Super-Small Stuff ANSWER KEY

1. Nanotechnology is used to describe things that are made and **experiments** that are done at the **nanoscale**.

2. The nanoscale uses units called **nanometers**. A single one of these tiny units is equal to **one-billionth** of a meter.

3. Nanoparticles are tiny bits of matter that are between **1** and **100** nanometers.

4. **Nanomaterials** from when nanoparticles join together.

5. The **scanning tunneling microscope** was invented in 1981. It allowed scientists to see **individual atoms**.

6. The **atomic force microscope** was created in 1986. It worked for more materials because it didn't need to use **electricity**.

7. **Buckyballs** are round, hollow nanoparticles made from carbon.

8. Scientists make **carbon nanotubes** by rolling a sheet of graphite molecules into a tube.

9. **Graphene** is a sheet of carbon that is one atom thick.

10. **Nanobots** are tiny machines that could be injected into people's bodies to give medical care.

11. Some sunscreens contain nanoparticles of **minerals/zinc oxide/titanium oxide**. These particles make the sunscreen **clear/invisible**.

12. **Nanocoatings** can keep eyeglasses from fogging up. They can also prevent things from sticking to **boats** or **planes**.

13. Adding **nanoparticles** to medicines can help them attack **cancer cells** so people don't feel as sick.

14. Some **fabrics** contain silver nanoparticles. These nanoparticles have ions that kill **bacteria** and keep clothes from stinking.