

DragonflyTV Nano: Celebrating the Science of the Small

These days “nanotechnology” is the buzzword in science circles and beyond. Each week, news stories covering curious new applications of this groundbreaking science have people asking: What’s nano all about? *DragonflyTV Nano* was designed to answer these questions—and more—by giving kids (and their parents and educators!) a basic primer in this revolutionary science.

So what exactly is “nanoscience?”

A nanometer is *one billionth* of a meter. At this size, the size of atoms and molecules, materials take on new properties, making possible new applications that could alter everyday items from the clothes we wear to the cars we drive. Nanotechnology is already influencing medical treatments, energy efficiency, and more.

True to DragonflyTV’s “real kids doing real science” philosophy, the nano series features middle-school kids pursuing inquiry-based investigations at science centers and research labs nationwide. In addition, for the first time in the show’s seven year history, this season forms its own minicurriculum. (No pun intended!) Each show builds on a concept from the previous episode. Although shows are stand alone, the series is most powerful if viewed in order.

The *DragonflyTV Nano Scope and Sequence*, which is based on current research on how children best learn nano concepts, presents the “big ideas” in nanoscience and nanotechnology. (For further information, please see *DragonflyTV Nano Scope and Sequence* on pages 71–72.)

In addition to the series’ main topics, we show kids the tools that let scientists see and manipulate things that are invisible to the naked eye. Children learn about the technologies engineers use to design nanoscale products and the many career opportunities in the field. They also learn to think more critically about nanoproduct claims and possible societal implications.

Each show on the DVD accompanying this guide includes: two story segments featuring inquiry investigations; scientist profiles providing insight into career opportunities; “Zoom Cab” journeys offering glimpses of nanoscale features in everyday objects and “Hey, Wait a Nanosecond” clips capturing kids’ views on ethical issues. The main investigations are listed by show on the next page.





Show 701: Size and Scale

What's Nano?—How big is one billion and how small is one nanometer? **Where's Nano?**—What examples of nanoscale science and technology can we find in our everyday lives? *In this episode, viewers are introduced to the nanoscale and how it relates to the macro- and micro-scale worlds, including examples of nanoscale objects, nanoscience, and nanotechnology in our everyday lives. And they see some tools that scientists use to investigate and manipulate nanomaterials.*

Show 702: Structure of Matter

Hockey Sticks—How do carbon nanotube hockey sticks compare to wood and composite sticks? **Butterfly Wings**—Why do some butterflies change color when you look at them from different angles? *In this episode, viewers see that all matter is made of atoms. Atoms interact with other atoms to form molecules. At the nanoscale, the structure of atoms and molecules give matter unique properties.*

Show 703: Small is Different

Surface Area—How does surface area affect how things react? **Stained Glass**—How can gold look red and silver look yellow? *In this episode, viewers see that properties of matter at the nanoscale can be different than properties of the same material at the macroscale.*

Show 704: Forces at the Nanoscale

Gecko Feet—Which lizards are the best climbers and why? **Nasturtium Leaves**—Why does water bead up on some leaves and not others? *In this episode, viewers see that forces other than gravity dominate the nanoscale.*

Show 705: Applications

Self-Assembly—How can some things at the nanoscale assemble all by themselves? **Bone Regrowth**—What's the best nanomixture to make the strongest bone repair? *In this episode, viewers see that scientists can manipulate matter at the nanoscale to create new materials and applications.*



Show 706: Nanotechnology and Society

Water Clean-up—Can nanoiron clean up the pollution in soil and prevent it from getting into drinking water? **Nanosilver**—Does any nanosilver leak out of socks when they are washed? *In this episode, viewers see that nanotechnology will change the way we live. As with all scientific advances, it will affect society in both good and bad ways and in ways we cannot yet predict.*

