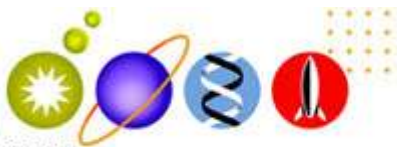


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SCIENCE BUDDIES

Project Ideas Roundup



September 2010

Bio-Rad Brings the Science of Biofuel to Students and Classrooms

Students can join the search for cleaner, more-efficient fuels

Scientists are always looking for ways to improve on technology that already exists, and in today's world, that means seeking out environmentally friendly and efficiently produced alternatives (like *biofuels*) for a product we use every day--gasoline. With the help of Bio-Rad's Biofuel Enzyme Kit, students and classes can join the search as they learn how to [Turn Plants into Biofuel with the Power of Enzymes](#). They'll start by exploring the cellulobiase enzyme, which helps turn plant-based cellulose into glucose, a key component in the production of the biofuel ethanol. *This project allows plenty of room for independent exploration!*



For an introduction to biofuels, check out [Go Green by Growing Green: How to Extract Energy from Grass](#). To delve even deeper, try [Biodiesels: Converting Oil into Clean Fuel](#).

Pinhole Photography

Back to basics



Taking pictures without a lens? It's true! Students won't need a darkroom or a high-end camera for this science project. Instead, the [Photography with a Pinhole Camera](#) project offers a hands-on look at important photography fundamentals as students experiment with one of the most basic versions of a "camera." Using a pinhole camera to take photos with films of varying speeds in differing light settings will bring the importance of "exposure" time into focus! Plus, they'll have fun building their own kit-based cameras. *This one isn't just point-and-click, but the "developments" will be eye-opening!* (Difficulty: 4-5)

Sign Up for Our Free Teacher Webinar

Take a free guided tour of Science Buddies

We've rescheduled our free **Teacher Professional Development Webinar** for September 22 at 4 p.m. PDT. Please join us for a **one-hour guided virtual tour of Science Buddies**. We'll introduce you to our resources and show you how you can use Science Buddies in your classroom.



For more information, visit the [Science Buddies blog](#).

Radical Root Reactions

Give your plants a geotropic spin



Anyone who has ever stuck toothpicks into an avocado seed and suspended it over a cup knows the roots will shoot "down." But what if you threw the roots for a loop, rotating them as they grew? Would they grow in

"Sprinklers, Sprinklers, Go Away..."

Play electronics detective to eliminate water waste



It's late at night, and you're being lulled to

another direction? In the [How Do Roots Grow When the Direction of Gravity Changes?](#) project, students will explore the fascinating concept of geotropism--the directional growth of an organism in response to gravity.

Using readily available materials to make "seed sandwiches," students will rotate budding rootlets in various directions and observe what happens. *Ready, set, rotate those roots!* (Difficulty: 4-8)



sleep by the calming sound of rain outside. All of a sudden, you're jolted awake by "ch-ch-ch-sssss!" as several sprinklers rise up from the ground and start spraying water all over the already-wet grass. What's going on? It's raining, so why are the sprinklers running? Whether they have sprinklers in their yards or not, this science project poses an interesting problem for students to solve as they explore basic electronics in [Green Technology: Build an Electronic Rain Detector to Conserve Water](#). (Difficulty: 6)

Planning Ahead: Long-Term Science Projects

Science projects come in all shapes, sizes, and areas of science

While some whizz-bang science effects can be observed in a matter of minutes, **many fascinating projects and experiments take more time**. As school gets underway for the year, we hope you'll encourage your students to consider long-term projects. Working on a long-term project--one that might take weeks, or even months, to conduct--lets young scientists **really immerse themselves in the science** and the data they collect.

The following projects aren't ones that can be done "last minute," but **for students willing to spend the time**, these can be exciting and rewarding projects to explore!

- With free software from Carnegie Mellon, students can turn a favorite story--or an original tale--into an animated movie. As they bring characters to life with [Storytelling Alice: Once Upon a Time in a Computer-generated Land...](#), they'll learn basic *computer science* programming skills. (Difficulty 5-8)
- From heart rates to bed times, our bodies each have their own rhythms throughout the day. Students can delve into *human biology and health* as they explore human circadian cycles in [Can Your Body Temperature Tell the Time of Day?](#). (Difficulty: 6)
- Kimchi is a traditional Korean cabbage dish that owes its unique flavor to the activity of numerous microorganisms. In the [Kimchi Chemistry](#) *cooking*

Turn Space Science into Spending Money



A contest for students curious about craters, baffled by black holes, or pensive about planets.

This school year, students can turn their interest in space into a **cash prize** by entering the **Science Buddies Astronomy Science Project Contest**. Students can enter novel astronomy projects, or try [one of ours](#). Full guidelines and submission information will be posted soon on the Science Buddies website.

Give Them the Big Picture: They Could Win Multiple Awards!



As your students plan their science projects, remind them that **with a single, well-executed science fair project**, they could be eligible for a number of different **special awards** at a local or regional science fair.

Regional fairs often have special awards for which a project might qualify. For example, **Bio-Rad Laboratories gives a "Best in Biological Category"** cash award in both the junior and senior divisions at the Contra Costa County Science & Engineering Fair (CCCSEF) each year.

Students can also **enter the same science fair project they did for their school fair** into other contests outside of school, such as the Science Buddies Astronomy Science Project Contest.

Researching local and regional fairs, as well as other contest opportunities, early in the science project planning process helps

and food science project, students will observe the chemical changes that occur in the pH and glucose levels during fermentation. (Difficulty: 6-7)

- Our oceans play a critical role in absorbing CO₂ and buffering the greenhouse effect, but as oceans absorb carbon dioxide, their acidity changes. In the [Swimming in Acid ocean sciences](#) project, students will explore the process of ocean acidification as they make sea water, increase its acidity, and observe the impact on empty mussel shells. (Difficulty: 7)
- It's a student's nightmare: the discovery of a zit the night before an important school event. In [Which Acne Medication Can Really Zap That Zit?](#), they'll investigate basic *microbiology* techniques to find out which products are most effective at dealing with the underlying bacteria. (Difficulty: 7-8)
- This *microbiology* project plays like the scene from a sci-fi movie--bacteriophage (phage, for short) try to pierce the outer coats of bacteria and inject them with phage DNA. Can phage be used to fight human bacterial infections? Students can explore the idea for themselves in [Biowarfare: Experiment with Viruses that Destroy Bacteria](#). (Difficulty: 8)
- In the [Trace Your Ancient Ancestry Through DNA](#) *genetics and genomics* project, students can expand their family trees into the distant past. Based on genetic markers present in a sample of their DNA, students will find out their haplogroup and then use data from the Genographic Project to track information about ancient ancestors. (Difficulty: 9)

students know what prizes and contests are available in various areas of science--**and what steps they need to take to be eligible.**

Newly Released Science Project Ideas



The following Project Ideas were recently added to the Science Buddies library:

Difficulty: 1-5

- [That's a Pretty Tough Baby! A Study of Gender Stereotypes in Children](#)

Difficulty: 5-7

- [Feel Free to Sleep at School...If You're a Computer!](#)
- [Get Rid of Those Leftovers: How Much Organic Waste Can Composting Worms Eat?](#)
- [Green Technology: Build an Electronic Rain Detector to Conserve Water](#)
- [Smashing for Mash: The Science of Making Memorable Mashed Potatoes](#)
- [What's in a Face? Are Composite Faces More Attractive than Real Faces?](#)

Difficulty: 7-9

- [Biowarfare: Experiment with Viruses that Destroy Bacteria](#)
- [Turn Plants into Biofuel with the Power of Enzymes](#)

Share Your Science Success!

We get excited when you and your students succeed, and we are always interested in stories that showcase the ways in which Science Buddies supports and enriches science education for teachers, students, and parents. If you have a Science Buddies success to share, [let us hear from you!](#)



Help Students find the Perfect Project for *Them*

Our [Topic Selection Wizard](#) can help guide students to science projects that fit their



areas of interest *and* meet science fair requirements. Give it a try today!

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