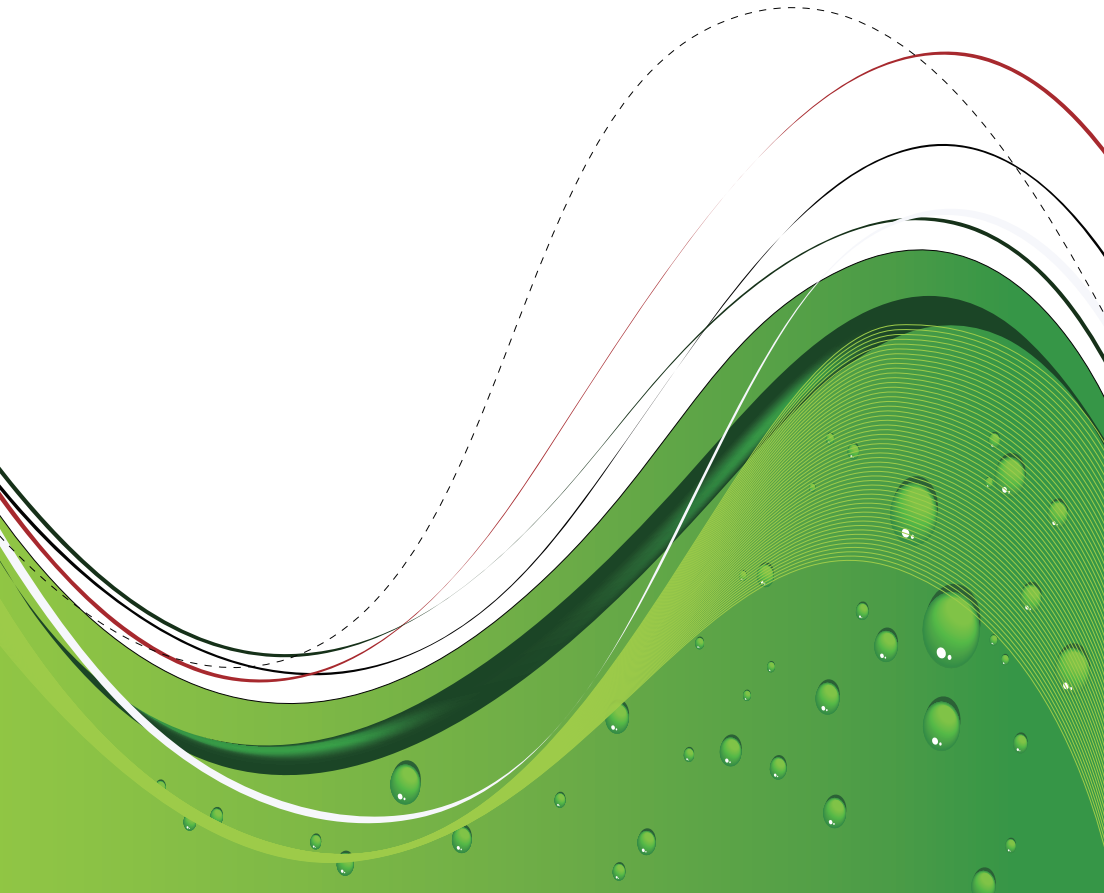
EXPLORE UTAH SCIENCE
ExploreUtahScience.org

D.I.Y. Science



Looking for help to grow your business? Start in your own backyard.

The spirit of entrepreneurism is alive and well in Utah, and the Governor's Office of Economic Development has resources to help your business build on that foundation.

A broad range of services includes:

- Consulting support at Business Resource Centers across the state
- Technology commercialization grants
- International trade missions and consulting
- Workforce development
- Rural development
- Assistance in bidding for government contracts
- STEM Action Center
- Avenue H health insurance marketplace

Utah Governor's Office of Economic Development

BUSINESS • TOURISM • FILM

business.utah.gov

801-538-8879

World Trade Center at City Creek
60 E. South Temple - Third Floor
Salt Lake City, UT 84111

UTAH

LIFE ELEVATED®

EXPLORE your science!

On the following pages are fun science experiments for you to do at home.

❍ *Why rocks have layers*
Experiment 1: Make fossil layers

❍ *DNA is the building block of life*
Experiment 2: See your own DNA

❍ *Science in the kitchen*
Experiment 3: Turn milk into cheese

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Why rocks have layers


photo: Mike O'Malley

Layered rock is made up of small pieces of **dirt**, **minerals**, **plants** and **animals** that settled to the bottom of ancient rivers and seas. Each layer comes from a different period of time, when Utah was covered in **seas**, **swamps**, **plains**, or **desert**.

Over hundreds of millions of years, the weight of the top layers pressed down on the bottom layers, slowly turning them into rock. Animals or plants that settled in the layers become **fossils**.

Dinosaur National Monument near Vernal, Utah, is an important site for fossil discovery. The ancient dinosaurs, plants, and animals are separated into **23** different layers of flattened rock that is up to **1.2 billion** years old

Experiment:
Make fossil layers

Create your own rock and fossil layers using bread and gummy animals.

SUPPLIES

- slices of three different types of bread (white, whole wheat, rye, etc.)
- gummy animals
- paper towels
- heavy books

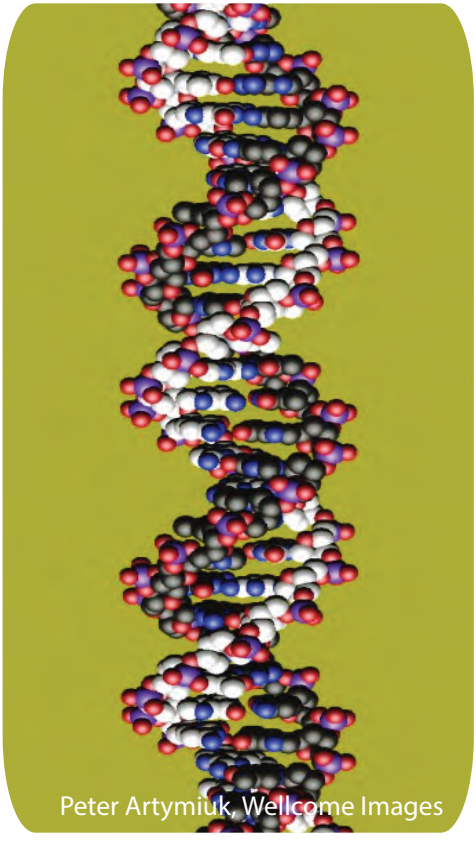
INSTRUCTIONS

1. On a paper towel, stack the three different types of bread like pancakes.
2. Insert the "fossils" (gummy animals), between the layers of bread.
3. Cover with another paper towel.
4. Stack the heavy books on top of the bread.
5. Wait for one day. No peeking!
6. Remove books and paper towel.

EXPLORE

- How thick is the bread and gummy worm stack before you put on the books? How about after the next day?
- Can you pull the layers apart?
- What happened to the "fossils"?

DNA is the building block of life



All living things including bacteria, plants, and animals have **deoxyribonucleic acid (DNA),** which contains the plans for building an entire organism. DNA in people is made up of about **25,000 genes**, each of which carries the instructions for **traits** such as eye color and height.

Mario Capecchi is a genetics professor at the University of Utah who won the **Nobel Prize** in Medicine in 2007. He figured out how to manipulate DNA in mice, including how to **turn off** specific **genes**. Scientists worldwide use his technique to learn what individual genes do in the body.

Experiment:
See your own DNA

Extract DNA from your cheek cells and see it with your own eyes.

SUPPLIES

- ❍ clear cup
- ❍ two spoons
- ❍ salt
- ❍ dishwashing liquid
- ❍ chilled rubbing alcohol

INSTRUCTIONS

1. Mix 1/2 spoonful of salt with 1/2 cup of water.
2. Swish a mouthful of the salt water for 1 full minute.
3. Spit the water back into the cup.
4. Add 1 drop of dishwashing liquid and stir gently so that no suds form.
5. Pour alcohol in clean spoon and gently dribble down side of the cup so it sits on top of the soapy liquid. Repeat until the alcohol layer is about 1cm high. Do not stir.
6. Wait a few minutes. The DNA will appear on top of the salt water.

EXPLORE

- ❍ Use a wood skewer or fork to lift up the DNA.
- ❍ What does the DNA look like? What is the consistency? Is that what you expected?
- ❍ Can you think of a way to extract DNA from soft fruit? Try it!

Science in the kitchen


photo:: Michael Robinson

Did you know cooks are scientists? **Baking**, **candy making**, and **cheese making** are just a few of the cooking techniques that depend on basic principles of **chemistry**, **biology**, and **physics**. You may already be an expert scientist without even knowing it!.

Utah State University's **Western Dairy Center** in **Logan** pioneers new technologies in cheese production, and is known for their famous squeaky cheese curds. **Cheese curds** are made when acid, or an enzyme called rennet, is added to milk. This process makes proteins in the milk, called **casein**, clump together, forming curds. The soft curds can be eaten as is, but to make **cheese**, the curd is drained, dried, and processed further to enhance flavors.

Experiment:
Turn milk into cheese

Add a little lemon juice to milk, and you get cheese!

SUPPLIES

- ❍ 2 clear cups
- ❍ milk
- ❍ lemon juice
- ❍ spoon
- ❍ cheesecloth or coffee filter
- ❍ rubber band

INSTRUCTIONS

1. Add 1/4 cup milk to clear cup.
2. Mix in 1 spoonful of lemon juice, or enough until you see clumping.
3. Put cheesecloth or filter over second cup and secure with rubber band.
4. Slowly pour milk mixture through the filter. Don't spill!
5. Wait for most of the liquid to drip through to the cup.
6. Carefully remove rubber band and gather up the filter around the clumps. Gently squeeze out any liquid.
7. Open up the filter.

EXPLORE

- ❍ What does it look like? How does it taste?
- ❍ Repeat the experiment using vinegar instead of lemon juice. Do you need to use more vinegar, or less?
- ❍ Can you think of other juices that might work? Try it!

The Brain Institute at The University of Utah

Lending Library of Learning Resources

- Brain and nervous system models
- Comparative anatomy models
- Neuroscience textbooks, posters
- Microscopes and slides
- Concussion goggles
- And much more!

Freely available to educators and volunteers in the Salt Lake City metro area. Request materials online. **brain.utah.edu/lendinglibrary**

BRAIN AWARENESS WEEK

coming March 10-16, 2014

As part of a worldwide campaign to elevate public awareness about the benefits of brain research, the University of Utah Program in Neuroscience brings Brain Awareness Week to thousands of K-12 students each year.

See our website to learn more.

brain.utah.edu/outreach

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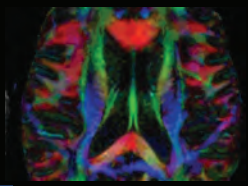

Uncovering science stories that matter to Utahns

We are proud to be the first-ever science news, information, and events internet resource designed to serve **Utah** locals.

Explore Utah Science was founded under the belief that our community needs to know about locally driven research, discoveries, and commercialization, and how these developments could affect our health, environment, economy, and our future. Find us at **ExploreUtahScience.org**

We welcome story ideas and suggestions!
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