Allergies

At times, we all sneeze and get runny noses. Does that mean we all have allergies? No. Most of us don’t react to things like plant pollen, dust mites, bee stings, animals with fur or feathers, or foods like peanut butter. For others, these can trigger allergic reactions. Sometimes there are serious consequences. In addition to the sneezing or itching, kids with allergies might also get an upset stomach, cough a lot, or have difficulty breathing.

Let’s think about how to reduce contact with allergens (things that trigger allergic reactions).

- Keesha wants a pet. A fish might be a good choice—no fur or feathers.
- Andrew wants to play outside. Before going out, he checks the weather report. He’ll feel better if the pollen count is not too high.
- Juan wants a snack. He reads food labels to look for any trace of “peanuts.”
- Jen is congested. Dust mites might be the cause. Air filters and floors without carpets will reduce the number of mites in her house.

Sometimes these steps are not enough. A doctor might suggest medicines or allergy shots.

Why is it that only some people have allergies? Kids are more likely to have allergies if their parents have allergies. Just like a child with the same blue eyes and brown hair as a parent, a child can inherit an immune system that is more sensitive to allergens.

But that is not the whole story. You have to be exposed to the troublesome allergen. If you are not around any dogs and never eat shrimp, you are not likely to become allergic to them. Both your family background and your environment are important pieces of the allergy puzzle.
Have you ever seen a powdery yellow dust in the air? It's not fairy dust. It's pollen. If you start to sneeze in certain months every year, you may have a *seasonal pollen allergy*. Look at the data and follow the directions.

1. On the graph, which two months show the highest grass pollen levels? Color those bars green. This shows GRASS ALLERGY SEASON.

2. Which two months have the highest weed pollen levels? Color those bars orange. This shows WEED ALLERGY SEASON.

3. Look at your graph. Are grass and weed allergy seasons in the same months?


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**Pollen and Mold Counts**

Go to www.aaaai.org

Find out when allergy season hits other U.S. cities. Click on the "Pollen and Spore Count" box and "Go." Find this information:

- The tree pollen count for Los Angeles in the Western Region. Ask for a graph of the past year.

Choose another city to find out more information.

**Food Allergies**

Should peanut butter be banned in school cafeterias?

Find out more so you can prepare for a debate in class.

Go to www.foodallergy.org

Go to www.fankids.org
Hypothesis:
Complete these hypotheses by choosing words to fill in the blanks.

1 out of 5 school-age children has allergies.

15 out of every 100 people are allergic to pets. They are allergic to the protein in saliva, urine, or flakes of skin, not the actual fur or feathers.

1 out of every 100 people is allergic to peanuts or other nuts.

1 ragweed plant can produce millions of grains of pollen in a single day.

1 gram of dust contains 500 dust mites.

Hay fever has nothing to do with hay. It's another name for seasonal plant allergies.

These figures represent data for the U.S.

Materials:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>bread</td>
<td></td>
</tr>
<tr>
<td>zipper-lock sandwich bags</td>
<td></td>
</tr>
<tr>
<td>marker</td>
<td></td>
</tr>
<tr>
<td>journal</td>
<td></td>
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<td>pencil</td>
<td></td>
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<tr>
<td>spray bottle of water</td>
<td></td>
</tr>
<tr>
<td>ruler</td>
<td></td>
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<tr>
<td>magnifying glass</td>
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</tbody>
</table>

Procedure:

Step 1: Work with a partner. Decide where to expose your bread to a possible source of mold. In your journal, write down where you will collect mold and the conditions that you are testing. Label the bags.

Step 2: Expose bread to air in the classroom, to the ground, plants, or something else.

Step 3: Close the bags completely and place them in the conditions to be tested.

[Caution: Do not open bags after closing them.]

Step 4: Check your bags for mold growth every other day for two weeks. Draw and describe what you see.

Step 5: Record your results (write down and draw what you observed). Share your findings.

Conclusions:
Do your results support your hypothesis?
What did other groups find out?

What’s an Allergy?

An allergy is a misdirected immune system reaction to things that are harmless for most people.
Who needs Super Heroes?
You’ve got your own personal defender, your immune system. It attacks germs and other harmful things. These invaders try to enter your body through the nose, mouth, or skin.

White blood cells are a key part of your immune system. Some white blood cells hang out in the lymph nodes waiting for action. Others travel around the body looking for suspicious invaders.

White blood cells can attack invaders in two main ways. Some white blood cells make antibodies. Others just gobble up invaders. The immune system might think pollen and other allergens are harmful, like the germs that invade your body. Your immune system makes a mistake, and then it overreacts.

What happens inside a person with a pollen allergy? First, pollen enters the nose. The cells inside the nose are ready with their secret antibody weapons. If pollen attaches to at least two Y-shaped antibody molecules on a cell, then the cell blows up. This releases the body chemical histamine. This chemical causes the itchy skin, drippy noses, and stomach cramps that come with most allergies.

Imagine you invented a new floor cleaner. It has a secret ingredient, never used before. To protect people using this product, safety testing is required before you can sell it. We know that certain chemicals, like those in poison ivy plants and metals such as nickel, can cause skin contact allergies. When these chemicals touch the skin of allergic people, itchy, red, bumpy skin results. How can we test the new ingredient?

Our immune system is complex. We cannot imitate all of its reactions in a test tube. To protect you and others from unsafe products, laws require animal testing. Scientists Ian Kimber, David Basketter, and Frank Gerberick are working to improve safety testing. What makes a better test? First of all, it’s more accurate. It should also use fewer animals, get results more quickly, and cost less.

The test developed by these scientists is called the local lymph node assay, or LLNA. Here’s how it works:
- First, an unknown chemical is painted on mouse ears.
- If it is an allergen, the chemical will cause the immune system to make more white blood cells.
- A scientist will then count the number of white blood cells in the lymph nodes near the ears.

Until the LLNA, the only approved skin contact allergy test looked for skin changes on guinea pigs. After applying a chemical, several scientists might look at the same guinea pig and not agree if they saw enough swelling or redness to indicate an allergic reaction. An allergic reaction is an immune system response, not just a skin problem. Follow-up testing might be necessary when using guinea pigs.

Why is the LLNA more accurate? The LLNA checks for an immune system response by counting white blood cells. Three times the normal number indicates an allergic reaction. If you have ever had a swollen gland, that was your lymph node swelling up with white blood cells to fight off the infection.

Scientists have found that this new test uses about one-half the number of animals. This is an example of how scientists look for ways to refine their tests and reduce the number of animals used. Scientists want to get reliable results that protect both people and animals.
Let’s pretend that you have a pet. You notice that your pet is chewing on its feet and scratching its ears more than usual. It’s up to you to collect data.

G When did the problems begin?
G What season is it?
G When does the pet chew and scratch? For how long?
G Has the pet tried a new food recently?
G Did you give your pet a bath with a new shampoo?
G Does your pet have fleas?
G Where does the pet sleep?

What’s wrong here? In May 1996, a little Jack Russell Terrier named Fergie developed terribly itchy skin. This cleared up after a few weeks but returned in August. The dog was miserable again. Where she lives, grass pollen is highest in May, and ragweed pollen season is in August. Was there a connection?

The dog was given allergy skin tests. Tiny amounts of grass and ragweed pollen extract were scratched onto her skin. When her skin puffed up in those spots, it proved she was allergic to grass and ragweed.

Why was it important to know what caused her problems? Then the veterinarian could suggest the right treatment. Fergie got an anti-histamine and other allergy medications. This stopped the skin from releasing the chemicals that cause itching. If she had been scratching because of fleas, she would have needed different treatment.

What do you think happened in the spring and summer of 1997? The allergies returned. Fergie felt worse than ever, and her scratching led to a skin infection. The medications did not control the allergic reactions without side effects. Next, the vet tried allergy shots. These shots help the body’s immune system to make antibodies that block the release of histamine.

In 1998 and 1999, Fergie remained allergy-free with no additional medicine or shots. She enjoyed being outdoors again. Thanks to allergy research with animals, Fergie got the right treatment.

Delving Deeper

Does it seem unfair that some kids are allergic to strawberries, ice cream, or chocolate? Just because you dislike some foods like broccoli doesn’t mean you are allergic to them. With a food allergy, your mouth might tingle, your tongue and throat swell up, you have trouble breathing, and your stomach cramps. You might even become unconscious. Anyone with food allergies must be a label reader.

Go on a scavenger hunt. Track down hidden peanuts, milk, wheat, fish, eggs, tomatoes, or soy. Bring the product labels to class for sharing. HINT: Look for gluten, lactose, casein, modified food starch.

Express Yourself

Let’s pretend that you have a pet. You notice that your pet is chewing on its feet and scratching its ears more than usual. It’s up to you to collect data.

G When did the problems begin?
G What season is it?
G When does the pet chew and scratch? For how long?
G Has the pet tried a new food recently?
G Did you give your pet a bath with a new shampoo?
G Does your pet have fleas?
G Where does the pet sleep?

Does the fur or skin look different? Describe the change or draw a picture.

Does the pet have a fever? Do the ears feel hot? Do they smell?

Could the pet have gotten a bee sting or insect bite?

Do any of your pet’s relatives have allergies?

Write down your answers. Now you have a history of your pet’s problem. You could report this to a vet.
Are you a future allergy detective? Allergy and Asthma Associates, a medical team in Virginia, searches for the cause of allergies from patient clues.

First, nurse Jean Evers meets with patients to take their history (see Express Yourself). After looking over the history, Dr. Richard Loria observes the patient for more clues. For example, he looks for mucus or swelling in the nose, studies skin rashes, and listens to the lungs.

The team might need further evidence to plan treatment. Skin tests can prove what triggers the allergy. Nurse Evers scratches very tiny drops of pollen, mold, and food extracts into the patient’s skin. She tests for allergies that are common in that region. She also checks the patient’s history for others that may be a problem. After 20 minutes, Dr. Loria checks for skin swelling. Then he suggests medications, a new diet, or allergy shots.

Keep in mind that you can’t use pollen directly from a tree and scratch it into the skin. That’s where a laboratory technician like Mary Durm comes in. She prepares extracts for skin tests and allergy shots.

What’s the reward for this team of allergy specialists? Just knowing they make people feel better.

Mary Durm prepares extracts for skin tests and allergy shots.

Ah, springtime ... .

What happens when people who are sensitive to oak pollen first breathe it in? Their immune system learns the pattern for making an antibody that matches the oak pollen. Not much else happens. Their immune system does go into action the next time, making plenty of antibody. Then comes the unpleasant dripping and sneezing, when lots of antibody and pollen match up.

Each antibody matches only one type of allergen. Match the pairs that go together in this puzzle.

Get ready for your future!

- Read about how the immune system works.
- Develop good listening skills.
- Learn about first aid.
- Volunteer at a hospital or an animal clinic.

Cool Careers

Cool Careers

BENDER

BENDER

MIND BENDER

MIND BENDER

www.joinhand.org