

Explore Climate Science

What's climate change?

Weather is a specific event—like a rainstorm or hot day—that happens over a few hours, days, or weeks. **Climate** is average weather patterns in an area over a longer period—like 20 or 30 years.

Climate change is when weather patterns in certain areas change over time. Most scientists believe that climate change is happening and making our weather more extreme. It's causing rising seas, stronger storms, and shifting habitats. Small, naturally occurring changes contribute to climate change, but human activity is responsible for most of it. Unfortunately, this creates problems for people, plants, and animals.

What's the connection between climate change and carbon?

Plants make their own food! They take carbon out of the air. They use it, along with water and energy from the sun, to make food. Plants store about half of the carbon that they take in. The other half is released back into the air. When the plants eventually die, the carbon they had stored gets released back into the air, too. This is called the **carbon cycle**. When forests get cut down and other plants die, not as much carbon is taken out of the atmosphere.

Communities, countries, and businesses measure their **carbon footprint**. That term refers to the amount of **carbon dioxide**, or CO₂—a greenhouse gas caused by human activities—that gets released into the environment. Factories, cars, planes, and other technological innovations create carbon dioxide.

Greenhouse gases, such as carbon dioxide, are among the main reasons that the climate is changing. The bigger the carbon footprint, the more greenhouse gases that are being released into the atmosphere. They trap heat from the sun and cause the earth to get hotter. When this happens, glaciers melt and water levels rise.

In the last few hundred years, the earth's temperature has gone up by 2 degrees Fahrenheit. This sounds like a small change, but it's enough to hurt people, plants, and the planet.

Try It Out! Explore weather and climate.

You'll need: a handful of colored beads or other items, a bag or bowl, paper, and a pencil.

Instructions:

1. Put the beads in a bag or bowl. They represent different kinds of weather in an imaginary town.
2. Name your town. Decide and write down what kind of weather each color represents. For example, purple beads might represent rainy days and orange beads might represent warm, sunny days.
3. Close your eyes and choose your first bead. This is the weather for your first day. Write down the type of weather for that day. Continue with the rest of your beads.
4. Count how many times each kind of weather occurred in your town. Remember, this is how many beads of each color you have. That represents the climate for a given period.
5. Analyze what you found. For instance, was it mostly sunny and warm, cold and rainy, or something else? If the climate in your town changed, how? Why do you think it's important to keep track of weather from day to day?

What can we do to stop climate change? What can I do to help?

We can't solve climate change on our own. We need to work with others. Everyone has a role to play. Individuals, communities, businesses, and countries can all help stop climate change. Together, we can reduce the amount of pollution and prevent even worse climate change.

People can reduce their carbon footprint in many ways. They can refill a water bottle or cup instead of using disposable water bottles. They can turn off unused lights, or walk or ride a bike instead of driving. They can also reduce food waste and use fewer plastic and paper products. They can use showers and toilets that need less water.

What businesses and governments do makes an even bigger impact. They can find cleaner ways to make and ship products. They can reduce waste and use alternative energies, like electric, solar, or wind. They can make laws and policies about fuel in vehicles, pollution, or carbon limits.

Nature itself is also full of solutions! Trees clean the air by reducing greenhouse gases and pollution. They also cool communities and provide habitats for animals. Planting trees is one way to reduce pollution. Protecting existing forests will help, too. You can learn more about the power of trees with the [Girl Scout Tree Promise](#).

How can I learn more about climate change and climate science?

Scientists conduct studies and experiments. This helps them understand what is happening with climate and the environment. They need data from all over the world about weather, plants, animals, air, and land. All of these things connect as part of our global ecosystem.

When scientists need a lot of data for their research, they ask regular people to help collect it. This is called citizen science. You can help scientists learn more about climate by observing, measuring, gathering, and sharing data. To find out more about citizen science, check out the [Girl Scout Climate Challenge on SciStarter!](#)

Try It Out! Experiment with the greenhouse effect.

You'll need: 2 glasses of equal size, 2 cups of cold water, 10 ice cubes, a plastic bag, tape, and a sunny place.

Instructions:

1. Fill each glass with a cup of cold water and add five ice cubes. Wrap the top of one glass in a plastic bag and seal it tightly with tape.
2. Place both glasses in sunlight for about an hour.
3. After one hour, look at your glasses. The glass that was covered in plastic should be warmer.

What happened? The bag trapped heat in the glass. This is the same thing that happens when greenhouse gases trap heat in the atmosphere. Can you imagine this process happening to our planet?

Try It Out! Create a climate change superhero.

Imagine a new superhero who fights climate change. Show everything you can about your superhero. For example, why are they fighting climate change? What are their superpowers? What would their first mission be? How will they team up with others to make a difference?

Connect with Your Community

Think globally. Act locally. Climate change is a big problem, and many communities are not prepared. Communities need the climate that they're used to so they can survive. Some near coastal areas may end up underwater as sea levels rise. Others, like communities in California, are becoming even more dry and hot. That makes wildfires more common. Homes and land are burning up.

When we take care of our planet, we take care of our communities. Everything and everyone is connected in our global environment. Climate change happens everywhere, but it affects different people and communities in very different ways. This means that we need to fight climate change in ways that are fair. We must involve both the people affected by it and the people and businesses creating it. People and businesses who create the most greenhouse gases should do more of the work to combat climate change. We need to make sure that those most hurt by climate change

are included. This is called **climate justice**.

People everywhere are working to stop climate change. There's a big community of scientists, organizers, students, and others working together to stop climate change. Citizen scientists gather data. Engineers develop alternative energy sources and ways to remove greenhouse gases from the atmosphere. People plant trees, preserve existing forests, and design urban areas to prevent erosion or heat islands.

The world needs to make big changes to stop climate change. We need better plans for wildfires, floods, and hurricanes. We need safer and less expensive places to live. We need more eco-friendly public transportation and energy. We can start by learning what is going on in our community. By connecting with others, you can learn new information and skills. You can work together to change the world!

How can I learn more about climate change and my community?

You can be a leader, advocate, and activist for the environment at any age! Start by thinking about changes you can make. Then learn more about your community. Find out what others are doing. What groups are already making a difference? How can you get involved?

Not sure where to get started? Check out these ideas for ways to learn more about climate and your community:

- **Go somewhere.** Visit a park, garden, or nursery. Go to a marine center or water facility. Attend a community event, like a beach or neighborhood cleanup. Explore how climate change affects the people, animals, and plants where you live. Find out how you can protect the environment in your area. What can you do on your own? How can you work together with others?

- **Talk to someone.** Talk to a park ranger, marine biologist, or any other expert about how climate change has impacted your local area. Interview friends, family, and others. Meet with a local nonprofit or group that's protecting the planet. What do people know about climate change? How does it make them feel? What are they doing to make a difference? How can you help them?
- **Do something.** Learn through action! Plant a tree or remove invasive species from your community. Reach out to a local official. Talk to your family about what you can do together. Watch videos and find articles about climate and your community. What can you do as an individual to fight climate change? How can you connect with others to make even more of an impact?

Share Hope

To stop climate change, everyone needs to act! Choose one part of climate change that interests you and is important to your community. Make a project to spread awareness. Climate change may seem like an unsolvable problem, but you can help others learn about climate change and what they can do to fight it.

Create a message to share with your community. Use what you've learned to invite them to make a change. Include an action people can take to help the planet.

For example:

- **Invite others to reduce their carbon footprint.** Ask them to walk, ride a bike, or take public transportation. Invite them to use less plastic. Plant trees or a garden.
- **Educate others through art.** Make posters. Host a puppet show. Write a story. Paint a mural.
- **Call on community leaders, government officials, and businesses.** Share how you feel about climate change and what you'd like them to do about it. Write letters. Make a video. Visit your elected officials. Attend community events and rallies.

You can work with others to create your message. You also have resources to help you. Start with friends and family members. Ask experts. Talk to businesses and community groups. They might have ideas, materials, or volunteers to help. You can also connect with other environmental groups. They can help you, and you can help them! Reach out to your library. Contact local colleges and universities. Look at local and international organizations.

When people learn about your challenge project, they may be inspired to act, too. Let your community know what you would like them to do. Start at home or with your Girl Scout troop. Then invite your larger community, like the people at your school, place of worship, or local businesses. Talk to local leaders and elected officials. Share your project and ask them to make climate-friendly choices.

And remember, don't be shy! Contact your local newspapers, magazines, TV stations, and radio stations. They want to know what people in the community are doing. And if they choose to do a story, even more people will learn what they can do to help!

When you're done, make sure you celebrate! By informing and inspiring others, you've helped the world get one step closer to beating climate change!

Not sure where to get started?

Check out these ideas to spread awareness about climate change:

- ▶ Create a collection of children's books or stories about climate action.
- ▶ Design a poster campaign, "how to" handout, or playbook.
- ▶ Perform a skit or make a movie.
- ▶ Draw a comic or design items.
- ▶ Give a speech or make a presentation.
- ▶ Write and perform a song.
- ▶ Host a workshop or event, like a play, art exhibit, citizen science day, or tree-planting event.
- ▶ Make an app, website, or blog.
- ▶ Write a letter.
- ▶ Advocate for a law, policy, or community improvement, like using solar energy or a new community garden.