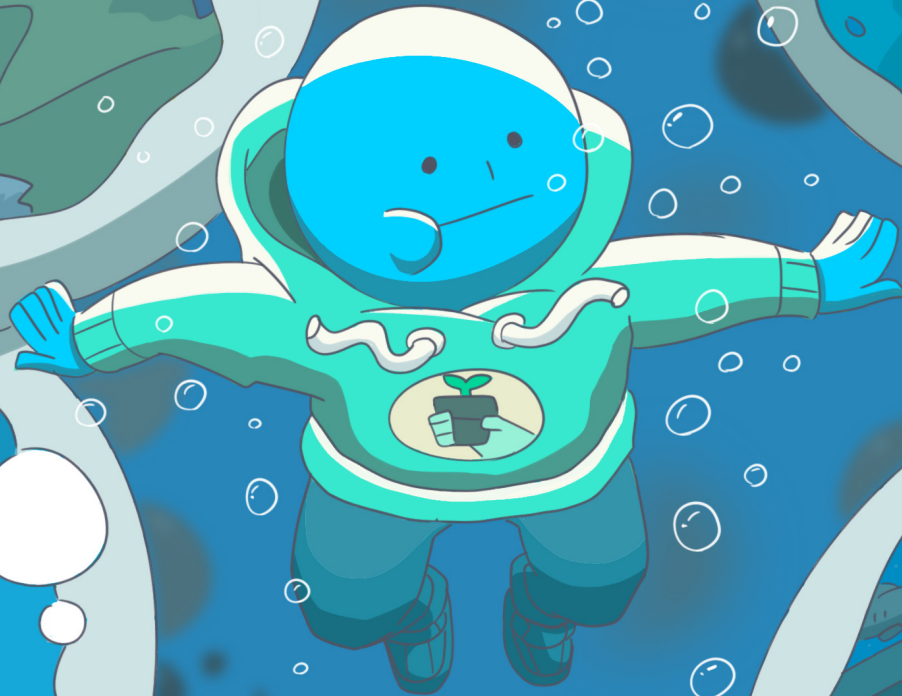


# SUSTAINABLE



# LEADERS IN ACTION

## THE WATER ISSUE



MARCH  
-2021-  
VOLUME 2  
ISSUE 3



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# Growing Greens



BY ALEXI LINDEMAN  
ART BY KYLE SUEN

*With the spring season right around the corner, it's time to start planning out our gardens. While raised planter boxes or rows of plants may be the first thing that comes to mind, there are numerous garden designs that might suit your purposes better or are simply fascinating to learn about. Many of these designs can also be combined to find the best of both worlds!*

## TRADITIONAL DIRT

The most important thing is to make sure your dirt has all of the right nutrients and is at the correct pH level for the plant. Besides that, get creative! You can use raised planter boxes, dig directly into the soil, train your plants to growth up trellises, plant in towers and more! For irrigation, consider using a drip system instead of watering by hand or with sprinklers. This will save between 30-65% water as drip irrigation is 90-95% efficient while spray is 30-60% efficient.

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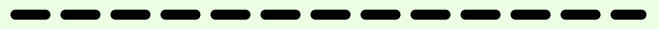
You can also irrigate your garden with greywater. This can be as easy as putting a bucket in the shower, then watering your plants. To cut out this manual labor, consider investing in a laundry to landscape system—use washing machine water for landscaping. One load of laundry can use between 14-20 gallons of water! Imagine how much water you could save over 1 year, around 1000 gallons! The best part of all is that this system can be installed fairly easily for \$150-\$300. Something to keep in mind is that you would have to use biodegradable or plant-safe soap. However, if you use bleach, wash heavily soiled materials, or clean with anything else unfit for plants, you can easily direct that water to the sewer with an accessible 3-way valve. Check out [this link](#) or [this video](#) to learn more about laundry to landscape or click here to find more ways to [reuse gray water](#).





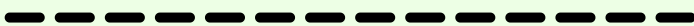
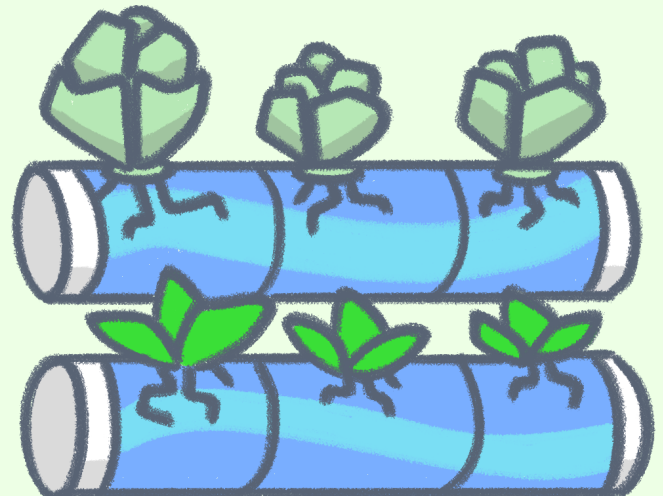
## AEROPONICS

Aeroponics, growing plants in the air with misting of roots, is a form of hydroponics. A timer could control how often the pump/mister is on (eg. 15 min on, 15 min off), thus less water would be lost to evaporation and less energy would be used to run the pump. The [Tower Garden](#), although pricey, is an excellent aeroponics system you can buy to compactly grow more veggies faster, easier, and with fewer resources ([98% less water, 60% less fertilizer, and no pesticides](#)). [A study](#) also showed that plants grown aeroponically contained more antioxidants thus tasted better (look it up, numerous people can testify). [Click here](#) to learn more about hydroponics!



## HYDROPONICS

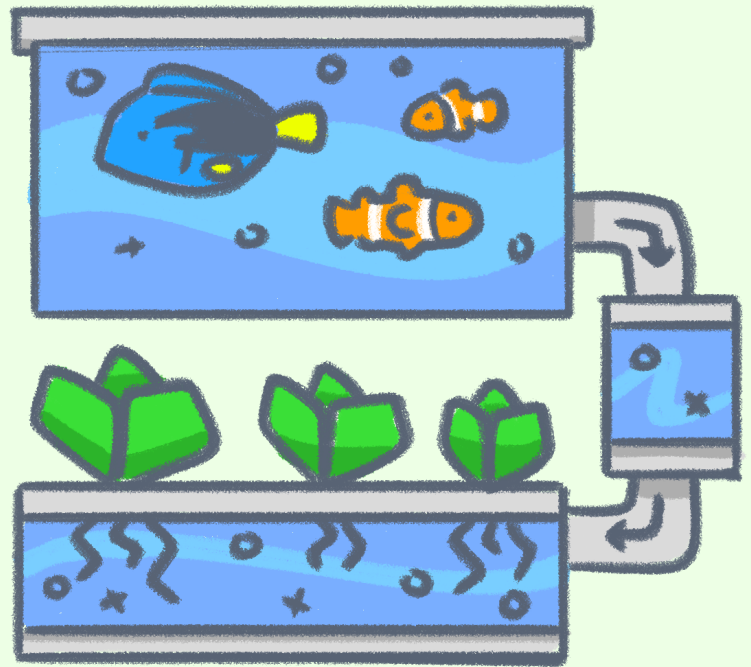
Hydroponics grows plants in water, typically cycled by a pump. Since these systems do not require dirt, there are less diseases, less pests, and best of all no weeds! Hydroponics also saves water and space. Since the plants are grown in a nutrient solution, their roots can more readily absorb the nutrients than in soil. The direct absorption of nutrients speeds up growth rate. Lettuce can be harvested in a month instead of two! In addition, hydroponic systems can often be stacked. They can use up to [10 times less water](#) because it can be recycled rather than absorbed into the soil, evaporating and running off. However, one will have to consider the costs involved. The building materials, energy, soluble nutrients, and replacement parts all add up. Some hydroponic systems require a constant flow of water to prevent the roots from drying out. If there is a power outage and the plants are left unattended, their roots will quickly dry out and die.



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## AQUAPONICS

Combine hydroponics with aquaculture (raising aquatic animals in tanks) and you have aquaponics. Essentially, one would use the water from a tank with fish, shellfish or any other aquatic animal, for their hydroponic system. The waste would provide nutrients for the plants and soluble fertilizer is no longer needed. Watch [this video](#) to learn about three simple aquaponic systems.



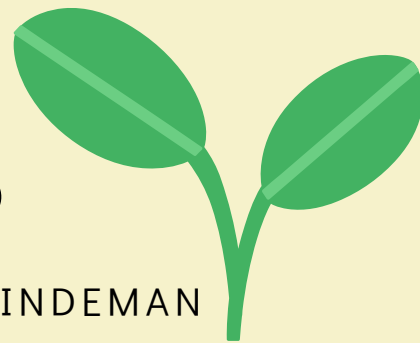
## VERTICAL GARDENING

As its name implies, vertical gardening is growing upwards. Growing vertically uses less space, makes it easier to tend to (who else hates crawling in the dirt?) and deters pests (ground squirrels eat everything!). Many of the systems above can include vertical gardening in them. Trellises, towers, stacks, and all sorts of possibilities are available. Just search up ideas to get all sorts of inspiration! For a challenge, incorporating upcycling into your garden by using old containers or looking up old materials on craigslist, or Offerup.

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# DIY Sprouts

BY ALEXI LINDEMAN



Pour 2 tablespoons of sprouting seeds in jar



Soak seeds for 8-12 hours



Use mesh lid, drill holes in lid or loosely screw on lid to strain



Drain the seeds, leave draining in dishrack or on towel



**DAY 1** Rinse the seeds 2-3 times a day!



**DAY 2**



**DAY 3** Done! [Learn more](#) about sprouts!



Put on salads, sandwiches, and more!

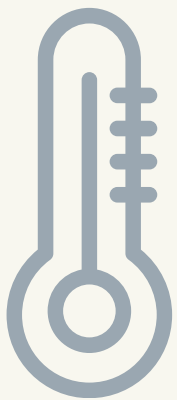
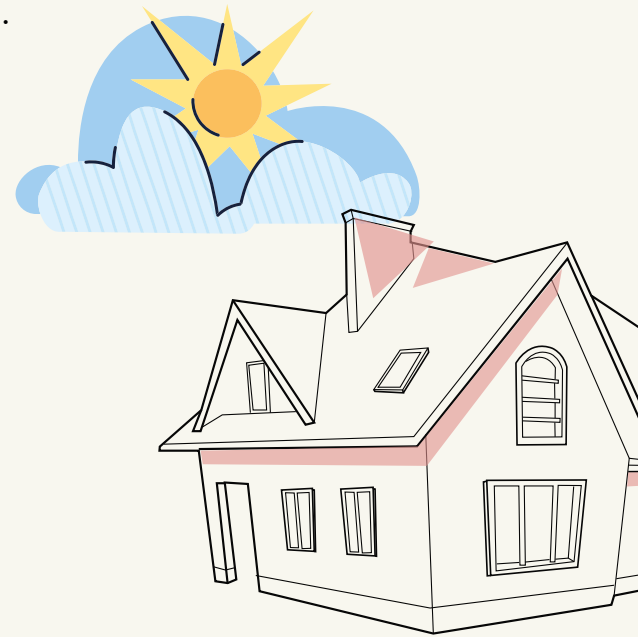
**I USED ALPHA SPROUTS, BUT YOU CAN USE VARIOUS ONES!**

# Passive Heating & Cooling

BY LUCA MATHIAS

Passive heating and cooling is an extremely sustainable method to regulate temperature as it relies solely on weather patterns. It seems kind of complicated at first, but passive heating and cooling are simply about knowing where the sun is and trying to capture as much sunlight as you can during the winter while keeping it out in the summer.

Fortunately, the sun already naturally does this. It's lower in the winter, easily shining into the house, and higher during the summer, thus cannot shine inside as easily. Some people prefer an active solar home as opposed to a passive solar home. The problem with active heating and cooling is that it requires a costly array of panels that will likely fail. Making passive heating and cooling is really easy and just relies on knowing where the sun is. If it is cold in your home, yet rather sunny outside, pick up a lot of free heat by simply pointing your windows toward the sun.



If it is an extremely hot summer day, you can use drapes or overhangs to avoid heat from entering your house. These are sustainable methods because they don't require the use of a heater or an air conditioner, which are both resources that are excessively used nowadays. It does cost a bit of money to take passive heating and cooling to an extreme level since many people like to design their homes in a way that caters for this process. Fortunately, it costs nothing for simple passive heating and cooling. This method isn't high tech or noticeably effective, but it is very simple and can be relatively effective nonetheless. Even though using an air conditioner and heater may be more quick and efficient, passive heating and cooling preserves our resources and doesn't take a toll on the environment.

Source

# Every Drop Counts

BY ABIGAIL STOFER  
PHOTOS BY SARAH KHAN

In a 2015 study done by Pew Research, it was shown that in every major region of the world, droughts were the one aspect of climate change that people are the most worried about. Crazy, right?



California is no stranger to droughts. In fact, there have been six droughts in the state's history, and in March of 2019, the state officially emerged from the most recent eight year long drought, making it one of the worst droughts in the history of the United States!

It all started in December of 2011, with the second driest December in California history, bringing many places to record or near-record dry conditions. By the winter of 2013-2014, the state had suffered through 3 consecutive below average rainfall seasons, and in early 2014, all but a few reservoirs were at less than 50% capacity, leading then governor Jerry Brown to declare a statewide emergency.

For California water users, 2014 was a tough year. A record warm winter accelerated the melting of the already miniscule snowpack, which California depends on for about one-third of its fresh water supply. There were \$810 million lost in crop revenue, \$203 million losses in livestock value, and \$454 million dollars spent to pump groundwater. In this year, 82% of California was classified in the highest extremity of drought.





But from there, the only place to go was up. In early 2016, things started to look up with a heavy rain, but hopes were quickly squashed by a record dry February. However, the first 11 days of January, 2017 brought this hope quickly back. The rainfall of those 11 days equaled to 25% of the average yearly rainfall for California, and from there, the wettest Sierra Nevada Mountain winter in a century began an upward trajectory that ultimately saved the state.



Droughts can have many causes and natural factors, but the large majority of scientists have linked major droughts to climate change. They occur when greenhouse gas emissions raise the air temperature, causing more moisture to evaporate in large bodies of water and soil.

Droughts have many consequences that affect every citizen. Since droughts dry up soil, they are extremely detrimental to crops, plants, livestock, and the farmers who depend on them for a living. In fact -- 40% of the world's population relies on agriculture as their main source of income. When crop failure happens, it affects everyone as food prices skyrocket and the threat of shortages approaches.

Additionally, droughts increase the likelihood of other natural disasters occurring. When rainfall eventually comes, the parched soil will be less likely to absorb this deluge of water, increasing the risk of major flooding. Also, droughts make tinderbox conditions just waiting to erupt in flames and with the less predictable rain, it will be much harder to contain these fires once they have started. We are especially seeing this on the United States' western coast, where the wildfire tendency has risen by 400% since 1970.

So what can you do to help cut back your household's water waste? If you have lived in or grew up in California, I am sure you are aware of some of these. Some incredibly simple tips are to take shorter showers, take baths, turn off the water while brushing your teeth, use your automatic dishwasher for full loads only, check faucets and pipes for leaks, water your lawn only when you need to (or even better, instal drought resistant landscaping), put a bucket in your shower to catch water and then reuse that water for watering plants or your lawn (Check out this months "Growing Greens" article for more information!) These actions may seem a little too easy, but I promise, every drop of water saved counts.





# Climate Change

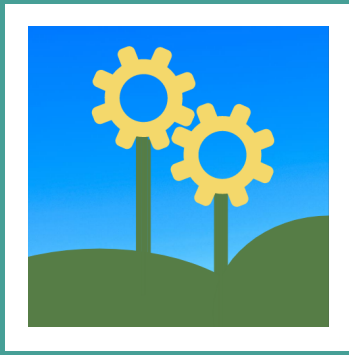
BY LUCA MATHIUS

Every year climate change, or global warming, continuously worsens. Right now, humans don't really understand the full scope of its consequences yet. However, we do know that polar bear habitats are gradually melting away since arctic ice isn't capable of overcoming the warming of the Earth. We know that it won't just be polar bears who are negatively affected from climate change. Eventually, natural resources will start to decrease, which will make it more difficult for humans to survive. The reason why it is so hard to fight climate change is because some people still don't believe that it is real and many do not know how to help or believe they can make a difference. Luckily, there are different solutions which we can carry out if everyone accepts that climate change is real, and that we need to alter our lifestyles to fix it.

In order to understand climate change, we need to understand where it comes from. Global warming is a type of warming known as the “greenhouse effect,” which occurs when the atmosphere traps heat radiating from Earth toward space. There are various gases in the atmosphere that block the heat from escaping and are more or less forcing climate change to occur. Some of these gases include methane, water vapor, nitrous oxide, and carbon dioxide. Essentially, humans have created different innovations and inventions in industry that contribute to the burning of fossil fuels, which has increased the atmospheric concentration of such gases. Greenhouse gases are not necessarily bad, but due to the rate and magnitude at which humans have wasted them, they have greatly contributed to the spread of global warming. Many people choose to ignore climate change because it has not affected their personal lives. However, there is proof that global warming has caused negative outcomes on our planet which will eventually take a toll on how we can thrive on this planet. If global warming continues, temperature will rise at a frantic rate. Our ecosystems and agriculture will become weaker if we allow global warming to persist, since frost-free season and growing season have gradually continued to increase. Since 2010, precipitation patterns have become more extreme, taking a toll on our environment. Certain areas are going to experience an unhealthy amount of rain while some areas will experience an extremely unhealthy drought. As temperatures continue to rise, then so will heat waves which negatively impact agriculture and farming. The increase of global average temperature will also result in an increase in natural disasters like hurricanes, rising sea levels, and the melting of ice.

While climate change is scary, there are various solutions that humans can carry out to prevent it by changing everyday habits a little. One easy option for kids who want to do something about climate change is to join youth clubs or movements that advocate sustainability. It’s important for young people to do something about global warming because they are the future. If the youth are on board with finding sustainable solutions to prevent climate change, we can create a better planet for future generations. If you can, installing solar panels into your home is a great and sustainable solution for what fossil fuels provide. If you can’t, try to find renewable energy corporations to join. Make sure to also meet with your bank and make sure that your investments are not going towards fossil fuels. America’s consumerism also largely contributes to climate change. We like to buy and consume at an excessive amount. An alternative is to go out into nature! Go out for a hike or a bike ride at your local park or forest. Our planet is beautiful and precious and we can make sure it stays that way if we make sustainable choices to preserve our natural resources.





# CLIMATE CAREERS CHAT

*Sustainable Leaders in Action were joined by Ann Arbor's sustainability and innovations manager, Missy Stults, and Marine Mammal Center's director of conservation education, Adam Ratner. Both panelists provided intriguing experiences, insightful messages about how careers are not set in stone, and an inspiring outlook on life for people of all ages.*

## WATCH NOW

### MISSY STULTS

Missy grew up in conservative Indiana and later moved to Maine to study marine biology. There she discovered her love for humpback whale communication patterns and the first blossoms of her life-changing passion for the environment and society. She took a class on the ethics of climate change and learned that this climate crisis would impact everything, including those she loved and cared for. Missy knew she wanted environmental science to be part of her career, but she was not interested in just physical science. Rather, she wanted to be at the intersection between climate change and society.

After applying for numerous jobs, she was accepted at Columbia where she would branch beyond the scientific facts about what would happen in a changing climate. Instead, she answered the “so what” questions of climate change. Questions like, how would climate change affect places economically or socially? After this, she dove into numerous jobs on various scales. She went from helping NY City develop their water supply plan, to working on the Kyoto Protocol on an international scale—adding to avoid deforestation this was too slow-paced as it took. Later she joined a non-profit striving to implement climate and sustainability into the local government, whether it was with indigenous populations, New York, or tiny Deven Massachusetts. After this, she was pulled to the private sector and despised it. Missy is mission-driven. She craves for a purpose. A purpose which the private sector simply could not provide.

By working for an applied Ph.D. at the University of Michigan Ann Arbor she escaped the job she despised. Instead, she sought to extend her education to ensure there was no excuse for people to not invite her into the conversation. When she was working on her Ph.D., Missy was hired to work on US climate assessment to help write the chapter on local climate adaptation. After this, she was planning to work in DC during the Clinton administration, but with President Trump elected, she was left jobless.

**“My job is to be the chief disruptor. I have to disrupt the systems that aren’t working. Our socio-economic systems are unjust. We have racial disparities that exist, and of course, climate change is wreaking hazard”**

In response to this “gut punch,” Missy went back to work with local and indigenous practitioners on helping craft investments. For her, this was fascinating and frustrating as she had no way to use money, she could only provide advice. Thus, she applied for a job at the University of Washington to run the climate program and was accepted.

Only due to this job security and her past experiences was she able to do what happened next.

One day, Ann Arbor called her and said they would like to hire her. Missy declined but said she could provide them recommendations instead when they pressed further. The next day, the city manager of Ann Arbor calls her and she knows this was not just a call, it was an interview. Accordingly, she just becomes blatantly honest. Ann Arbor was a champion but not anymore. It’s a blue dot in a sea of red that is ridden with greenwashing and needs to decide if the climate is a priority or not. The recruiter says she has the job and she declines again. And once again they insist that she meets them one last time before leaving. At the third meeting, Missy says her opinion with no filter, and the administrator says she has the job.

This time, Missy names a price; she says what budget, political support, location, team, and everything else she needs, and they agree to it all. She tells them to put it on paper and they agree. In the 2 ½ years since becoming Ann Arbor’s first sustainability director, she has raised the budget to 2 million and was on the way to a budget of \$10 million pre covid. Her job is to make Ann Arbor the most sustainable community. With a job like this, she never stops working, she “thinks about climate all the time.”

# ADAM RATNER



Adam's story emphasizes the array of pathways one could use to enter the world of climate change. Between being diagnosed with a learning disability and a speech impediment, Adam struggled a lot in school as a child, growing up on the East Coast. Despite this, he's glad to have been raised in a supportive community, and through this, he was able to find his passions. As he got older, he realized that he had the opportunity to explore different paths. He could not find what he was looking for in the world he lived in, but given the chance to experience a new one--through snorkelling--he found direction. "There was just an entire world underneath the waves that we just don't get to see," he recalls, describing the moment he decided to study the ocean. Find the career who wanted, however, was a winding path. Going on to college, he pursued the things that interested him, like marine biology, animals, or psychology.



He thought he would enjoy biology, but he tried taking a cellular biology class, and absolutely disliked it--which is why Adam strongly encourages experimenting and taking a variety of subjects to see what you like. In his experimentation, he wanted to challenge himself, and an opportunity presented itself in being a tour guide at his college. Public speaking, considering his past struggles, and being someone who "didn't talk or didn't talk well" was a clear challenge, and yet, it turned out that he loved it. Towards the end of college, Adam tried to figure out a career that would mesh all these skills and experiences.

Like college, he tried out different positions to see what really fit. At the University of Maryland, he worked with birds and put tiny headphones on them to test their hearing; to see if their behaviour would change based on the environment they lived in. He worked in this for two years--listening to over 200,000 birdcalls--before coming to the realization that he was simply not nearly fond enough of birds. That didn't work out, but he was still fascinated with animal behaviour. He moved on to study the learning and memory of zebrafish, studying to see if they could tell the difference between colours or swim through different hoops. He was able to successfully teach them to do so, but after a year of working with them, he decided fish did not work out for him either.

He happened across a conference, and while looking for talks to attend, Adam met an expert on blue whales--which he loves, compared to smaller things like birds or fish. He finds them truly special, as he recalls the way two second and first grade classes could always successfully identify them. Now, as he speaks with this expert, he asks him about the life expectancy for a blue whale. The researcher could not answer him. He asks about where they give birth, and yet the expert still could give him a definitive answer--no one had ever seen a blue whale give birth. Adam found it astonishing that many of the basic knowledge around blue whales, despite being such an extraordinary and well-known creature was still unknown: where do they go, how long can they live, where do they give birth? It was here when he realized that this is what he wanted to learn.



Now set on studying whales, he realized suddenly that some of them were getting sick, getting hit by boats. He saw how seals were getting caught in the trash and how climate change was impacting the ocean, acidifying and hurting its inhabitants. It occurred to him that there would be no point in studying how long a blue whale might live if there were none left surviving--he wanted to save ocean animals. And so, he switched from "hard sciences" to conservation. This journey took him to the Marine Mammal Center, where he has worked for the last 12 years. The Marine Mammal Center is currently the world's largest marine mammal hospital and education facility. They have a location in CA as well as Hawaii, and their job is to rescue any marine animals found sick or hurt, and return them to the ocean once they've been given a clean bill of health.

Even just through volunteer work, Adam has been able to rescue and treat animals. But even beyond that, Adam aimed to find what makes them sick in the first place and became some of the first people to find cancer in these animals, to discover algae, toxins, or parasites that hurt them. He works to help publish papers and work with other scientists around the world to answer the questions he carried over from college. His public speaking skills help spread his own story and be a guide for visitors to the Marine Mammal Center. At the heart of things, Adam aims to give science meaning, give a true application of all the things we've learned about marine animals and the problems they undergo. He calls on people to build upon the knowledge that all fields contribute, and inspire a community that will make positive changes in the environment.

**“So there are so many opportunities here where, you can fit in at any level within climate or conservation or marine biology, and you have skills that you can bring to the table. No matter what you've heard growing up, no matter what struggles you face, there is a role for you.”**



# Vegan Chocolate Chip Cookies

BY BROOKE ABESS



*If you love a classic chocolate chip cookie, but are interested in adding a twist, then look no further than these almond chocolate chip cookies! With just six simple ingredients, one bowl, and about twenty minutes, you can make these delicious treats! As the perfect combination of rich chocolate flavors, a slight hint of salt, and a punch from the nutty almond base, these cookies are sure to be a crowd-pleaser! And even better, they are both vegan and gluten free!*



# INGREDIENTS

- 1 cup almond flour (blanched)
- ¼ teaspoon salt ½ cup almond butter (should be without added salt or sugar)
- ¼ cup maple syrup, agave, or other liquid sweetener
- 1 teaspoon vanilla extract
- ⅓ cup vegan chocolate chips
- Optional (but recommended): ½ teaspoon almond extract



**Time: 20 min**

**Yield: ~12 sm cookies**

**Adapted from: [The Vegan 8](#)**



## DIRECTIONS

1. Preheat your oven to 375°F and line a baking sheet with parchment paper.
2. In a large bowl, whisk together the dry ingredients, except the chocolate chips.
3. Then add the wet ingredients and stir. Once those are well combined, fold in the chocolate chips. The batter will be relatively sticky, but you should be able to roll them into balls.
4. Take the desired amount of batter and roll them into balls, placing them about two inches apart on your baking sheet. Press the balls down slightly, to ensure they cook evenly all the way through.
5. Bake for about 10 minutes, or until the edges begin to brown and the top cracks. Cool for about ten minutes before serving.

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