

THE
Reefertilizer[®] 

Beginner's Guide to



**CANNABIS
CULTIVATION**

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The Beginner's Guide to Cannabis Cultivation

V 1.5

Last Updated March 2021

-link fixes

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Introduction

So you've decided it's time to stop thinking about it and start growing your own cannabis. It will be an exciting journey where you will learn a lot about what it takes to grow a healthy and potent marijuana plant. Learning where cannabis comes from and how it's cultivated is a very rewarding experience.

Whether or not you know anything about growing cannabis, this guide will help make your journey much easier. Reefertilizer wants to help you grow good cannabis at home; we think it can be done by anyone. Follow us on social media where we share photos and grow journals of our own and from other growers like you. Our community is there to answer questions and share advice. Take a moment to follow us on your favourite app by clicking one or all the icons below.



When you share your pictures, don't forget to use the hashtag #growgoodweed

This guide is broken up in three parts. Each section represents a different phase in the life cycle of a cannabis plant.

Start is the beginning phase of growing cannabis. This section will cover setting up your grow space, planting your seeds, and everything that happens in the first few weeks of growth.

The Grow phase is when your plant is growing at the fastest rate. At this point we talk about plant management and care.

The Bloom phase is the final step of the cannabis life cycle. This is where we can determine the plant's gender, help increase bud growth, and finally harvest our plant.

If you want to get a snapshot of the entire process we have a timeline you can read [here](#).

Now let's get started growing cannabis!

Start



The real key to a good crop is having a healthy plant from start to finish. Not providing enough food or light during any of these phases will ultimately lower the quality and quantity of the final product. Monitoring the temperature, humidity, feeding schedule, and the overall state of your plants will greatly increase your success. With a little bit of research, you will be able to identify what elements are lacking, and how to fix that.

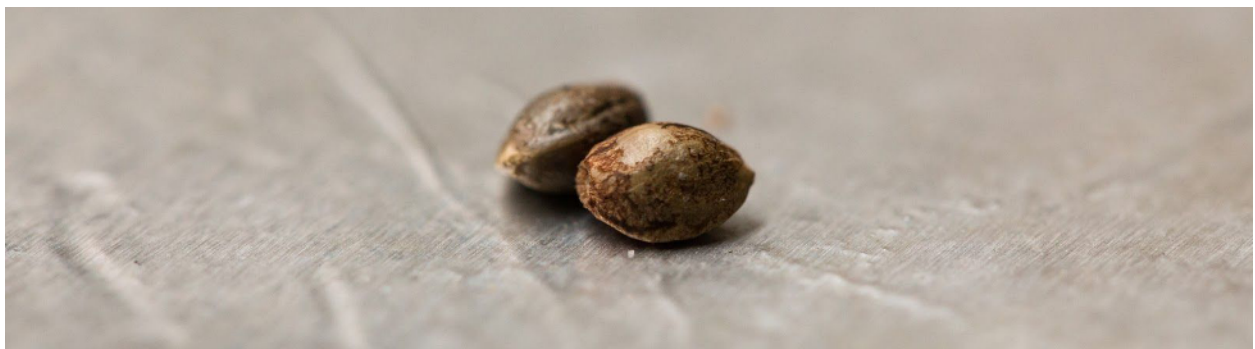


Selecting Seeds

A plant is only as good as its genetics, so it is important to get your seeds from a reputable source.

Some strains are better suited for different growing mediums, and experience levels. One strain could be more susceptible to disease while another might produce higher yields. All strains have their pros and cons, so choose one that best fits your ideals.

Most packs available commercially will contain 5 to 10 seeds. By sprouting half or more of your seeds you will be able to select the strongest looking plants. These stronger plants will produce the lion's share of your harvest. It's best to spend your time and energy on them. Smaller plants with weaker genetic traits will not produce as much bud and may be susceptible to disease.



Feminized Seeds

Feminized seeds are specially created to only produce female plants. Since plant gender can only be determined during the bloom or flowering phase, these can make your life much easier, by saving time and resources. Feminized seeds are usually a bit

more expensive than regular seeds, but well worth it.

Non feminized seeds will require that you remove male plants before they fertilize the females. Pollinated females will use their energy to produce seeds instead of potent buds. You can read more about plant gender below.

Auto-Flowering Seeds

Auto-flowering seeds are designed to start the blooming phase regardless of changes in the light schedule. Many will be able to harvest within 10 weeks from seed. They are attractive for their shorter lifespan, which will allow a few more harvests in a year.

Best Strains for Beginners

The two most recommended strains for beginners are [White Widow](#) and [Northern Lights](#). Feminized White Widow seeds are fairly easy to find. It's a very resilient strain and because it's not an auto-flower it can be quite forgiving if you manage to slow its growth during the veg state.

Northern Lights is an auto-flower and grows very quickly. Its flowering phase is only 8 weeks. It's also fairly high in THC, coming in at around 15%.

I'm not saying you need to use these strains for your first grow, they are just popular for those who want less hassle with their plants. Go out and experiment! A good thing to know is that pure sativa strains can have a very long flowering time.

Looking for Seeds?

[Crop King Seeds](#) and [True North Seed Bank](#) offer a wide variety of seeds. There you can find all sorts of cannabis strains to grow at home.

Choosing Your Grow Space



Grow Room

If you have the space, building a dedicated grow room might be perfect. By lining a room in your house with plastic to hold in moisture, you can create the perfect environment for growing cannabis. This way is usually more costly and will require a bit of handy work. Growing cannabis at home is limited to 4 plants (Canada). Having a dedicated room might be a little overkill unless you

have a medical license and want to grow many plants.



Growing Outdoors

Growing your cannabis outdoors is the natural way to grow. Growing indoors is essentially an attempt to emulate the outdoors as best as possible.

Cannabis grown outdoors will produce very nice yields, as well as enhance taste and smell. Mother nature is the absolute best when it comes to growing any kind of plant. The sun is also the best grow light known to man. There are a few cons when it comes to bugs, animals, and bad weather. On the other hand, you won't need to worry about carbon filters, lights, and fans.

You will need to start your seedlings and sprouts inside first. Many animals will want to eat small plants as a snack. Give them a head start inside first, and transplant them outdoors when they have a few sets of leaves first.

The number of harvest you can have a year will be limited to one.

Grow Tents



The most popular way to grow cannabis today is by using a grow tent. Grow tents come in all sorts of shapes and sizes. It's not very hard to find one that will fit into a closet or crawl space out of the way.

High quality grow tents are available many places online. Reefertilizer has grow tent kits available for purchase. A good tent will prevent light bleeding through, reducing efficiency. They will also help keep smells and moisture inside.

If you're interested in using a [scrog](#) or [LST](#), you will be able to get away with a shorter tent. Also, keep in mind, you will want a 1 foot distance between your light source and the plant's highest point.

The tent shown here is a good starting point for beginners. The dimensions of this tent are 48" x 48"x 80". It will fit 2-4 plants perfectly with enough space for fans and other hardware. They are available at [Reefertilizer.com](https://www.reefertilizer.com)



Space Buckets

Space buckets are becoming a popular and cheaper alternative to tents. The only thing is, they can usually only grow one plant at a time.

A space bucket is assembled with large buckets or plastic totes. LED light strips are attached to the inner walls, and another light source below the lid (LED or CFL). A fan is also attached to allow proper airflow.

As I said, these space buckets usually have just enough room for one plant. They can be easily hidden away and designed to be fully automated. Space buckets are a great option for beginners who don't want to spend too much on the initial setup or lack the space for a traditional tent. You can find some great examples of space buckets at www.reddit.com/r/spacebuckets

If you want to build your own, we have a step by step build guide on our blog. [How to build a SpaceBucket](#)

Basic Grow Tent Setup

For the sake of keeping it simple, I will go over the setup for a basic grow tent. The concepts are basically the same for all indoor grows. Two major players here are grow lights and air control. The bigger you go, the bigger your plants will be, but you also increase room for error. For a beginner it's best to start small at first, learn about the process, then you will be better experienced for a larger grow.

Fan requirements

The fan you choose Depends on the size of your growing area. You will need a strong enough fan to replace all the air every minute. To figure out your fan requirements, you first need to calculate the volume of your room. The grade school formula to calculate volume is length x width x height.

I live in North America so I will measure this all in feet and inches.

Let's calculate the right size fan for the 48" x 48" x 80" tent that I mentioned [above](#).

Step 1 - Calculate Volume

Converting to feet the calculation will be $4 \times 4 \times 6.6 = 105.6$
So the volume of the room is about 106 cubic feet.

Step 2 - Make-up for fan efficiency

The next thing we need to do is multiply the volume by 1.33
This is meant to take into account the carbon filter you will be attaching inside your tent. Your filter will lower the efficiency of your fan, so this calculation helps make up for that fact.

$106 \times 1.33 = 140.98$ (but let's round that up to 141)

Step 3 - Determine Optimum Fan Size

141 is your minimum CFM requirement for the above tent. CFM stands for Cubic Feet per Minute. You will need a strong enough fan to move that amount of air every minute. This is the absolute minimum requirement for your room. You're better off with a more powerful fan than you might think. Double this number and you will have more than enough power to work with. For a tent this size, I would recommend a 6' fan with a CFM of 400. [Here's a link to one on amazon.](#)

You want to go a little overkill for several reasons. Firstly, as your plants get larger, they will really enjoy the extra air flow and additional CO₂. Also the larger your plants are, the more heat they will generate. This heat added to the heat that your lights can raise the temperature substantially. A larger fan can be adjusted to blow out this hot air quickly and replace it with cooler air.

Fan speed can be adjusted with a [fan speed control box](#) which limits the power going to the exhaust fan. Having this control will give you a little more space to play with.

You don't want to use a bare minimum fan. It will have to run at full power at all times, this will wear out the motor early and be fairly loud.

A 4" fan is rated around 200CFM

A 6" fan is rated around 440CFM

A 8" fan is rated around 740CFM



Carbon Filter

Your carbon filter is used to reduce the amount of smell of flowering cannabis plants. When the plant is young, they won't smell very strong. When they reach flower they will develop the classic strong dank aroma. You typically don't want this smell around, it can be a little intoxicating and attract nosey neighbours.

Your filter will have to be the same size as your exhaust fan. So for the tent above this [4" filter](#) would be perfect. Carbon filters usually come with a washable sock that helps filter larger particles.

Lights

Many growers measure the success of their harvest by comparing total weight to the wattage of light. The reason for this is that light is the major factor for cannabis growth. Light is energy, and your plants utilize this energy to produce sugars and continue growth. The more powerful your light source, the better yields you will get come harvest. Outdoor plants grow much taller than indoor plants because the sun's energy is far more powerful than anything man made. Basically the more light, the bigger the harvest. A thing to consider here as well is power usage. More powerful lights might generate higher yields, but it will also generate a higher electricity bill. Also, the higher wattage of lights will increase the amount of heat they produce.

There are many considerations when it comes to choosing the right type of light for your grow. I will quickly go over the different types of lights used for growing cannabis.



CFL Fluorescence

CFL lights are widely available and come at a lower cost point. They are limited by the range of light spectrum they can output.

Pros	Cons
Cheap and plentiful.	Needs to be much closer to plants due to its low light output.
Fits into a normal light socket.	More bulbs are required per plant.
Great for small grows and for starting seedling and clones.	Different spectrum lights are required for grow and bloom.
Low heat.	



HID

HIDs (High-Intensity Discharge) are the most common in grow rooms around the world. There are two main types of HID lights; MH (Metal Halide) and HPS (High Pressure Sodium). MH bulbs are cooler on the light spectrum and work best with vegetative plants. HPS bulbs are in the red end of the spectrum and are best for flowering plants.

Pros	Cons
They are the “standard” grow lights	They require a ballast and reflector (usually included in a light kit)
Cheaper to buy than other lights	Produce a lot of heat. A good exhaust fan is necessary
Easy to set-up	Bulbs degrade over time
	High power cost

LED



LED (Light Emitting Diode) used for growing cannabis have been improving by leaps and bounds over the last few years. The number of lumens per watt have increased significantly. Some LED lights have the ability to change the light spectrum better suited for veg or flower with the flick of a switch.

Pros	Cons
Most energy efficient light for growing cannabis	A little more expensive to buy
Produce very little heat	Cheap options are usually poorly designed
Don't require a ballast	

How much light will you need?

There are several considerations, but the rule of thumb for cannabis is that you will need a minimum of 30 watts of light per square foot. So for the 4" x 4" x 6" tent, the square footage is 16" (width x length). A minimum wattage of 480 is required. An optimum wattage would be 50-80 watts per square foot. So 800 to 1280 watts would give you the best yields. You can get away with a lower wattage light but your plants won't reach their full potential.

Want a tent the easy way?

Reefertilizer has full indoor grow setups that are perfectly designed to grow 1 to 4 plants indoors. There is no need to pick and choose the right equipment to start since we've done all the hard work already. Visit our [comparison guide](#) to find the right tent for you.

Germinating Cannabis Seeds



Seeds need moisture and warmth to trigger germination. A popular method to induce seed germination is with a wet paper towel.

Placing seeds in a moist paper towel and then a plastic bag works really well. Keep this in a dark place where it won't be disturbed. The temperature should be between 20c and 32c (68F and 89F), and maintained for 2 to 7 days until the seed cracks and the taproot emerges.

If you have stubborn seeds that won't crack, place them in a glass of water for 12 hours then back in the wet paper towel.



Sowing The Seed

Once the white tap root emerges from the seed, it is very sensitive to light and air, it can easily be damaged. Carefully place the germinated seed in a hole ½” deep. Try to keep the tap root facing down. Then gently cover the hole with soil. A small planter of soil (like a Jiffy Pot) is made specifically for starting sprouts.

Keep the soil evenly moist, but not soaking wet. You may use a humidity tent to create the ideal environment for the germinated seeds. Small root cubes can dry out quickly, the tent helps prevent water from evaporating.



To learn even more details about germinating and planting you seed, visit our blog. We have a great article on the [first week of growing cannabis](#).

Cannabis Sprout



Once the plant sprouts, it has begun rooting within its container. Once they have their first sets of leaves, you can remove the humidity tent. You will then want to set up a fan to move air indirectly around the sprouts. Just enough air flow that the sprouts are only slightly moving. A high power fan aimed directly at sprouts will damage them. Your sprouts will need at least 16 hours of light daily. Having 18 hours of light will maximize photosynthesis. When it comes to feeding, your plants already have enough energy to continue growing for a few weeks. Once the sprouts start rapid foliage growth, the seedling stage is over and you should now transplant them into a larger soil container. This is the best time to give them their first feeding. The growth stage has begun and the plants will need more room to facilitate root growth.

Clones

Clones are clippings from a “mother plant” that are rooted in “rooting cubes”. A clone is an exact genetic match of the mother plant. Using them will speed up the time it takes for the plant to mature since you skip the whole seed germination process. They are also sometimes guaranteed to be female plants. You can make cuttings with a sanitized razor blade. Cut the stem at a 45 degree angle and dip it in rooting hormone. You then place it in the rooting medium, usually rockwool.

Transplanting

Transplanting involves moving the plant, its root system, and planter soil to a larger container of soil. This gives the plant more room to grow.

When should you transplant your cannabis plant? A simple rule is that when the leaves go out past your planter, it's time to transplant into a larger pot.

It can be tricky removing the plant from its planter, and great care should be taken.

Before you start, the soil should be a little moist but not soaking wet. This will help the roots and dirt stay together.

Prepare the container you're transplanting into by lightly moistening the soil and digging a space for your plant.



Carefully remove the plant from its planter. Don't pull the plant from the stem. You gotta be logical like Mr. Spock. With your palm side down, making the vulcan hand sign, slide your hand over the planter, with the stem between the gap of your fingers. Flip the planter onto the palm of your hand, so that the plant is now upside down. Carefully remove the planter. You may need to squeeze the sides and tap the bottom to get it loose. You should see some roots that look pretty cool but they are very sensitive to light and air. Quickly and carefully put it in its new spot.

If it's available sprinkle a few scoops [Reefertilizer Start](#) into the hole. This compost contains mycorrhizae, a fungus that grows symbiotically with roots. It will protect your roots and increase water and nutrient uptake.

Fill the empty spaces with soil. Make sure the transplant is flush with the soil. Products like jiffy cubes and biodegradable planters can simply be placed in new soil. If you're using rockwool cubes, be sure to remove the plastic.



GROW

Once the plant has entered its grow or vegetative stage it will require 16 to 18 hours of uninterrupted light a day. Your grow room should maintain a temperature between 18 and 28 degrees Celsius. A relative humidity between 40 and 60 percent should be maintained as well. Marijuana plants can live indefinitely if this light schedule and environment is maintained. A properly maintained plant may grow 1/2 to 2 inches a day. Growers have the ability to move on to the flowering stage whenever they decide to lower the amount of uninterrupted light to a 12-12 hour schedule. Autoflowering strains will naturally switch to flower no matter what the light schedule is.

If your growing outdoors this light schedule won't make much sense. Once the days begin to get longer than 12 hours you can put your plants outside. Many Canadians will transplant their plants on the Victoria Day Long weekend in May. This is when the light is plentiful and the temperature is warm enough.



Growing Medium

Cannabis can be grown many ways. It is most commonly grown in nutrient rich soil. Starting with a great soil mix can greatly benefit your plants through all its growth cycles. A good soil mix depends on 3 major factors; texture, pH, and nutrient content. Growers combine soil with compost and other amendments (such as perlite), to make a soil mix that works best with their strain and growing style. Having soil that drains well and allows roots to breath and grow is crucial.

Never use soil dug up from the backyard. It will most likely contain pests, or harmful fungus, or other elements that could harm your plants.

Adding amendments to the soil can aid in different ways. Perlite is a light mineral that helps make space for roots to grow. It will also help your soil hold water.

Mycorrhizae is a fungus that grows around roots. It helps hold moisture around the root preventing dehydration. It also improves the uptake of water and nutrients.

Humates are a type of organic matter that is rich with micro nutrients and is known to make plants grow vigorously. Both humates and mycorrhizae are combined in [Reefertilizer Start formula](#), and makes an excellent addition to any soil mix, for cannabis or any other plant.

Planting Cannabis Outdoors

Planting cannabis outdoors isn't much different than planting anything else outdoors.

You have two options, planting directly in the soil, or growing your plant inside a bucket or planter. Growing in a bucket means you will be able to move your plant freely. If

there's bad weather, you could move your plant to shelter. One downside is that the soil will dry out faster on warm days, requiring you to water more often.

Growing in the soil is the natural way. If you have access to a sunny space of dirt, definitely consider growing in the ground.

You will want to start by finding a nice sunny spot that gets the most sun possible throughout the day. Dig a hole in the ground and remove any rocks, roots, or sticks.

The size of the hole you dig will influence the size of your plants.

A hole that is 2 feet wide and 2 1/2 feet deep will work great. Space your holes about 3 feet from each other. Replace the dirt you dug up with your soil mix, and you will transplant directly into that nutrient rich fresh soil, making sure your transplant is flush with the ground.

Basic Cannabis Soil Mix

2 Part - Potting Soil

2 Part - Compost / Manure / Earthworm castings

1 Part - Perlite

You can add many other things to this soil mix that would enrich your soil even more.

Mycorrhizae is a fungus that grows symbiotically with roots. It's used all over the world because of it's ability to protect roots from infection and improve the roots ability to absorb nutrients. Humates (humic and fulvic acid) are a type of advanced compost.

They enhance the mycorrhizae and enrich your soil with very beneficial elements.

[Reefertilizer Start](#) contains both mycorrhizae and humates. Adding 3 scoops to 4 litres of soil will give your plants the best start possible.



Nutrients

You will need plant nutrients specifically made for cannabis growth. Reefertilizer is a simple, effective, three-step fertilizer and nutrients system that makes it easy for anyone to grow cannabis at home. One set of nutrients for each stage of growth. It makes growing cannabis foolproof.

Marijuana plants during the vegetative phase require high amounts of nitrogen to maintain growth. Nitrogen is the major component of amino acids which are used in all growth processes. Amino acids are used in plant cells as building blocks for protein, the green chlorophyll pigment, and enzymes.

A [full NPK fertilizer](#) like Reefertilizer contains the big three required elements, Nitrogen, Phosphorus, and Potassium. It contains other micro nutrients beneficial to the growth of the plant. Your plant will use these elements to help transport energy and build new leaves and stems. The bigger your plant, the more nutrients it will need to sustain growth.

Feeding Your Plants

Typically you will be feeding your plants once a week, and watering them once or twice a week as required. The first thing you will do is look at the instructions on your package

of nutrients. You will want to follow these usage instructions closely to avoid “burning” your plants by over feeding. Below is the feeding schedule for [Reefertilizer nutrients](#).



Veg Phase

Start feeding your plants Reefertilizer Grow when the plant has 3-4 sets of leaves.

Veg Week 1	1 scoop mixed into 4L of water
Veg Week 2	2 scoops mixed into 4L of water
Veg Week 3	3 scoops mixed into 4L of water
Additional Veg Weeks	3 scoops mixed into 4L of water

Flower Phase

Start feeding your plants Reefertilizer Bloom when you switch lights to 12/12 or when preflowers appear.

Flower Weeks 1-3	1 scoop mixed into 4L of water
Flower Weeks 4-8	2 scoops mixed into 4L of water
Additional Flower Weeks	2 scoops mixed into 4L of water
1-2 weeks before harvest	Flush plants with plain water



If you look closely, you will see how the amount of nutrients used is slowly increased over time. This is to prevent over fertilizing your plants. A well experienced grower will learn just how much they can push it when it comes to nutrients. Different strains will react differently.

Many other brands will recommend higher doses than you need. Reefertilizer goes lower so you aren't wasting nutrients or possibly harming your plants. Start with a low dose and raise it with every feeding. If your leaf tips are turning brown, you're feeding your plants slightly too much. Go a little easier on the nutrients for your next feeding.

Adding more nutrients won't make your plants grow at double the speed. Your plants growth is limited by the amount of light available and their genetics. The larger they grow the more nutrients they will require. Just like any living thing, the more nutrients they utilize the more they grow, and more food will be required to sustain that growth.

When you're feeding or watering your plants, avoid getting water on your leaves. Pour your water around the base of the plant. The reason for this is that fertilized water may damage your leaves. Also, the extra water on your leaves may collect in the buds or nodes and facilitate mold. This doesn't mean your foliage doesn't like water. In fact, a little bit of water is good on your leaves, you just don't want too much. Misting your leaves with a spray bottle after you water your plants is good practice. You shouldn't mist a flowering cannabis plant.

ALWAYS CHECK YOUR pH BEFORE WATERING!!! I can't stress this enough. 90% of the problems you might have can be avoided by maintaining the right pH. If your pH is too far out of the correct range you will suffer from nutrient lockout. Nutrient lockout is when the plant roots are unable to chemically metabolise nutrients. The result is nutrient deficiency symptoms. Many people will try adjusting their nutrients to fix the problem when all they need to do is get the pH in the right zone.

The perfect pH level for cannabis is soil is between 6 and 6.5. If you're growing hydroponically it's slightly lower (more acidic), 5.5 to 6.

Powder Fertilizer Vs. Liquid Fertilizer

Both have their pros and cons of course. Both types will need to be pre-mixed with a small amount of water before being added to your larger water vessel. A liquid fertilizer mixes a little quicker than a powder fertilizer.

Liquid fertilizer can be a little messy and harder to store, while powder fertilizers need to be stored in an airtight container but have an indefinite shelf life.

With liquid fertilizer, solids may settle at the bottom of the container, so shaking is required before measuring each dosage. Powder fertilizer doesn't have this sediment problem.

Synthetic powder fertilizers show higher ratios of NPK which means a little can go a long way, but if not used carefully they could harm your plants. What it comes down to is growers preference, people use what they are comfortable with, and what they know best.

For beginners I recommend using [Reefertilizer](#). It contains all the essential nutrients for cannabis in a simple to use powder. Liquid nutrients have become over complicated and require mixing multiple solutions together. Reefertilizer simplifies this so you can concentrate on other things.

pH and PPM

pH

pH is a measurement of acidity or alkalinity of a solution. The scale goes from 0 to 14. Anything below 7 is considered acidic, while anything above 7 is alkaline (basic). 7 is considered a neutral solution.

You can eliminate 90% of cannabis growing problems by maintaining the correct pH balance.

Cannabis plants thrive in a soil with a pH between 6 and 6.5 (slightly acidic). To maintain this balance you must measure the pH of whatever solution you give your plants. If you're watering them with pure water, check the pH. If using a fertilizer, test the pH of the solution you will be feeding your plants.

The only exceptions are when you're flushing your plants before harvest. You can use regular un pH-ed water.

To test the pH level, you can use either a [pH tester pen](#) or pH tester strips.

The tester strips are much cheaper but far less accurate. They work by dipping your strip in the solution and comparing it to a color chart. If your solution isn't clear, it may be difficult to get an accurate reading.

The pH pen can be more expensive, and a little more difficult to maintain. They will give you a very accurate readout to the decimal point. The only complaint with pH pens is that if they aren't maintained correctly, they will lose accuracy.

It may be a good idea to have two or more pH testing methods to compare against each other.

If your pH is too low or too high, you can use a pH adjusting solution. They come in two obvious types, [pH up](#), and [pH down](#). Using just a few drops from the appropriate solution will bring your solution to the appropriate level between 6 and 6.5 (for soil).

Measuring pH

A pH pen measures the level of acidity in a liquid. They can be purchased from many sources online, starter ones should cost you \$25-\$30. pH meters have a tendency to lose accuracy after time, so when you buy one make sure it comes with calibration fluid or powder.

pH calibration solution has a very consistent pH level. By testing your pen in this solution you'll be able to tell if it's accurate or not. There should be a little screw on the back of the meter that allows you to adjust the reading to match the pH of the calibration solution. [Read more about calibrating pH pens.](#)

You should measure the pH of anything you add to the soil. If you're giving your plants clean water, measure the pH and make sure it's in the correct range. The same goes for water with nutrients in it.

Just be sure to measure the pH after the solution has been mixed well.

Soil is a very good pH buffer, it will naturally keep the pH in the correct range. If the runoff water is too high or low, you might have too much or not enough nutrients in the soil. Measuring the pH of your runoff water is optional but will give you a glimpse of whether the pH of your soil is going up or down.

For a soil grow you will want your pH to be in the range of 6-6.5. While in a hydroponic grow it can be between 5.5 and 6.5.

90% of the issues people have with growing cannabis have to do with incorrect pH levels.

Adjusting pH

When you're adding nutrients to your water, it may affect your pH levels. This is why you should check the pH only after it is fully mixed. If the pH is not within the target range, you will have to add an acid or a base to lower or raise the pH value.

There are commercial pH down and pH up products, but you can also use natural products like lemon juice to raise the acidity (lower pH) or baking soda to lower the acidity (raise pH).

When adjusting the pH, add a little at a time, and then measure pH. It can be tricky getting it just right. The last thing you want to be doing is using both pH up and down to force it into the right range.

Measuring TDS

[TDS pens](#) measure the total amount of dissolved solids in a liquid. They measure in PPM units. PPM stands for parts per million.

RO (reverse osmosis) water should have a PPM close to 0. RO machines will strip out any minerals contained in water.

Tap water has a PPM in the range of 30-300 and contains calcium and other minerals. Some tap water contains high amounts of chlorine, which isn't good for your soil or plants. To remove excess chlorine in your water simply put it in an open container overnight. The chlorine will evaporate over time.

The reason growers measure TDS is to determine the number of nutrients being utilized by the plant. For a soil grow it's not completely necessary, but it's recommended for hydroponic setups.

When you add nutrients to your water, it will raise the PPM unit of the solution. Compare this result to the PPM reading of the soil runoff or hydroponic solution before adding new nutrients. The difference will give you an idea of how many minerals are being absorbed by your plants.

Using RO water will obviously give the most accurate results, and in a hydro setup, this is very important. Soil grows are much more forgiving, and PPM can be measured less strictly.

The PPM value that's right for your plants will increase as it grows. Young plants do well being fed a nutrient solution that's around 200-400 ppm. During the second half of the flower phase the recommended PPM can be as high as 1600.

TDS pens measure the ppm by calculating the electrical conductivity of the solution. The electrical conductivity (EC) raises with the amount of minerals in the water. This measurement is defined in Seimens per unit area ($\mu\text{S}/\text{cm}$). A TDS meter will calculate the PPM. Depending on the formula used, the PPM measurement might be different from one meter to another. Some find it simpler to measure the concentration of nutrients in EC than PPM because it can be more accurate.

The ideal ranges of EC for cannabis is 0.8-1.2 for young plants. By the end of flower the EC of your nutrient solution will be up around 2.

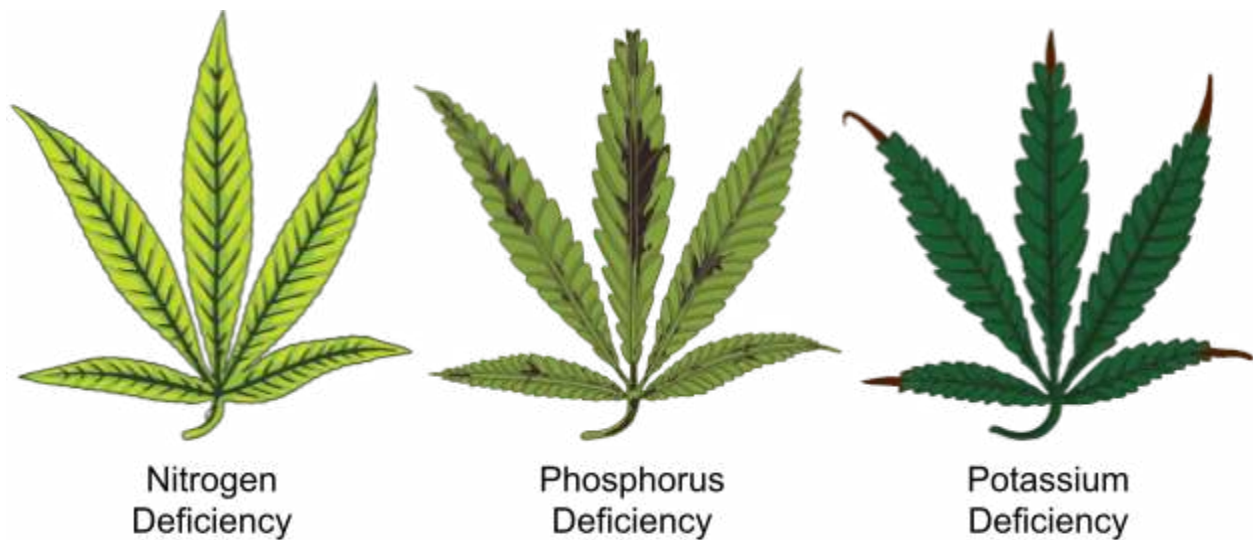
ALL STRAINS ARE DIFFERENT

Some plants will like lower levels of nutrients while others can take larger doses. Watch your plants and see how they react to different levels of nutrients.

If you see burnt tips, dial down the concentration of your nutrients next feeding.

Soil Multimeters

Soil multimeters are usually garbage. The cheap ones are especially inaccurate, take up space, and can only be used in one pot at a time. If you really want one though, there are more expensive digital soil probes that will do a much better job.



Deficiencies

During the vegetative phase of marijuana growth, your plant will grow as quickly as possible. Vigorous growth must be maintained by adding additional fertilizer. Depending on factors such as your soil content, fertilizer used, water used, soil pH, and your plants' individual needs, certain nutrients may be needed over others.

Symptoms of deficiency typically don't show themselves until a week or two after the plant has already been suffering.

Nitrogen deficiencies are the most common with cannabis plants. Nitrogen deficiency symptoms will start on the lower leaves by slowly turning them yellow. These symptoms will then move up the plant, starting with older leaves then affecting newer leaves at the top.

Mobile Nutrients vs Immobile Nutrients

Symptoms of a nitrogen deficiency are typical to mobile nutrient deficiencies. Mobile

nutrients like nitrogen, phosphorus, and potassium move through the plant quickly, moving to where they are needed most at any given time. In the case of nitrogen, the element is used for new growth at the top of the plant. This causes the lower leaves to show signs of the deficiency. Mobile nutrient deficiencies move from the bottom of the plant to the top.

Immobile nutrients like manganese, iron, and sulfur affect newer leaves first. They are immobile and remain where they were initially needed. Non-mobile deficiency symptoms move from the top of the plant and down.

Understanding these two types of nutrients can help you narrow down what deficiencies your plant is suffering from. Referring to a deficiency chart online can also help you diagnose the missing elements to your feeding strategy.



Cannabis Plant Suffering From Magnesium Deficiency



Nitrogen Deficiency (yellowing of leaves) Due to Over Watering

“Needs More Cal Mag”

“Cal Mag” refers to calcium and magnesium. Water soluble “Cal Mag” can save the day when your plant is showing the deficiencies of those nutrients. This may occur near the end of veg or the beginning of flower. As the plants’ growth phase changes it will require just a little more calcium and magnesium. The top leaves of the plant might begin to turn yellow, slowly getting worse from the inside out towards the tips. Adding a little cal mag solution will clear this up quickly.

Overwatering

A very common mistake among new growers is over watering your cannabis plants. Where water is an essential growth factor, too much water will harm your plant. There is not enough oxygen for the roots to breathe and the roots drown.

Symptoms start with the plant looking droopy, turning yellow and sometimes flopping over under its own weight. We recommend to only water the plant when the top surface of the soil is dry.

Check if the soil is dry enough to water by putting a finger an inch deep into the soil. If it feels moist or wet, then your plants don't need water.

Another tip that can help avoid over watering is to water less when it is cold. Try to water your plants right before their day cycle to allow water to evaporate properly through the day.

A sure sign of overwatering is when the top of your soil turns green from the buildup of algae. While overwatering can kill your plant it's an easily fixed situation. Let the soil dry out a little bit by watering less often. Once the symptoms stop you can start feeding your plants when the soil is dry.



Example of Fertilizer Burn

Over Fertilization

Adding too much fertilizer can be a problem, and will potentially damage your plants. Signs of fertilizer burn are browning of the tips of the leaves and brown spots on the leaves themselves.

When using a new fertilizer start with a lower dose than what's recommended and work your way up. This way you make sure you're not harming your plants by giving them too many nutes too soon. Adding more fertilizer will not make your plants magically grow faster or bigger, a special balance must be maintained. "Slow and Low" is the way to do it.

Over fertilized cannabis plants can be saved by leaching the soil with a very mild NPK water solution. Leach the soil with water at least 3 times the volume of soil in your planter.

Pruning

Pruning is a technique to help achieve higher yielding, and easier to manage plants. Pruning correctly can make your life a whole lot easier and really help your plants grow efficiently.

Pruning is when you remove leaves or branches from your plant. You might want to remove leaves that aren't receiving much light. Pruning will thin out your plant so it is using light more efficiently and will also help air move through your plant.

I like to remove a small handful of leaves every week or two. You don't want to remove too many leaves at a time, this may damage and stunt your plants growth.

You can prune leaves with a pair of snips or with your hands. If you're doing this by hand, don't tug the leaves off carelessly, you need to be gentle. Where the stem of the leaf meets the stem of the plant, gently wiggle the leaf stem back and forth. It will eventually snap free.



Cannabis Plant That Has Just Been Topped

Topping and Fimming

A very simple and common pruning technique is called topping or pinching the nodes. This technique is used when the plant has already grown 4 to 5 sets of leaves (nodes). By pinching off or cutting off the top most node, you change how the plant grows. Hormones within the plant that control growth get a little confused and trigger the plant to grow another top stem.

The difference between topping and fimming is where you cut your plant. When you top your plant you will cut off the complete node of new growth. The plant will then split into two tops and will continue growing. This produces a second large cola (top bud).

With fimming, you will leave a third of that budding intact. Fimming correctly will result in 3 or more tops

Pruning techniques like these help manage the plant size and how it grows. Plants that aren't maintained may grow large and fall under their own weight, pruning helps balance the growth of new branches. Topping works well with low stress training as seen below.



Examples of Low Stress Training

- A. Topped Plant With LST Using Plant Wire
- B. Closeup of LST Near The Base Of The Plant
- C. Super Cropping (lightly breaking branches)

LST (Low Stress Training)

Low stress training is the process of slowly bending your plant in such a way that it grows more efficiently. By holding branches down and away, it allows for more light and air to be absorbed by the leaves. You're training the plant to grow in whatever direction you choose.

A plant that isn't being trained will grow straight up to your light source. This will cause the higher leaves to block light from shining on the lower ones.

Using LST to spread your plant out evenly. This technique pairs well with a scrog and is a great beginner method of plant manipulation. By adjusting your plant a little each day, the plant will grow whichever way you want.

Nodes on branches that have been bent sideways will grow up and reach towards the light and become new tops.

Growers might use plastic twist ties fixed into the side of the planter to hold the branches in place. By using gardening wire, you can keep branches secure and growing in the direction you desire.

When bending the plant you must be careful not to snap or damage the stem or branches. A snapped branch will stress your plant and slow growth since it is now focusing its energy on fixing the damaged area.

You can speed up the repair of a broken branch by using a bit of tape to keep it in place. This will also protect the exposed area from airborne bacteria and pests.



SCROG (Screen of Green)

Another interesting technique is called a SCROG (Screen of Green). This involves laying a string lattice over your plants.

As branches grow you will carefully weave them into different squares of the lattice. This spreads out your plant horizontally and allows for a very efficient use of light. This is a

very good technique to use if you don't have much height to work with.

Sea of Green

Here's another technique called a Sea of Green (SoG).

Sometimes growers don't want to wait 1 or 2 months to harvest. What they do is induce flowering very soon after the vegetative phase starts. This causes the plant to start flowering earlier than usual. These smaller plants won't produce as much as a fully mature plant. But, if you have a whole bunch of small plants it can be worth it. For example, if you have many clones from a mother plant, and not enough space to grow them all to full size.

There are other pruning techniques out there. Just make sure to do your research before you take the clippers to your plant. Some pruning techniques are only used right before harvest, such as lollipoping.



Cloning

Cloning (clipping) is the most efficient and productive way for marijuana propagation.

Cloning is as simple as taking a plant cutting and rooting it in soil or a rooting cube.

These will produce an exact genetic copy of your mother plant. From one mother plant hundreds of new plants can be grown.

To ensure the survival of the clones, great care should be taken in the process of rooting them. The equipment needed is a sharp pair of scissors or a scalpel to make the cutting.

A rooting solution will help protect the exposed area of the plant and encourage root growth.

A rooting cube will give the perfect environment for the clipping to grow its root system.

Using an incubator (humidity tent) will help keep the cubes moist and protect the young clone from airborne bacteria and other pests.

Having your equipment ready and clean helps with execution. There are many products available commercially that will help your cuttings stay safe from infection while helping them develop their first sets of roots.

Theoretically, a plant can be cloned over and over again forever without degradation. As long as the mother plant stays in its vegetative stage, it will produce good clones no matter how old.



BLOOM

The bloom or flowering stage begins as soon as you switch to a 12-12 hour light and dark day schedule. In nature, this means fall has begun, and the plant will know that it should switch producing fruit.

As the Bloom phase starts you will have to switch from a nitrogen rich grow fertilizer to an appropriate [Bloom fertilizer](#). Your plant will now require less nitrogen and more phosphorus and potassium for flower production.

Water requirements might be slightly lower than in the vegetative state.

When changing the light schedule to 12 hours of light a day, it will take 1-3 weeks for your plant to show its first buds. These buds will grow rapidly for 4-5 weeks and then slow for the last few weeks of flowering.

In these last few weeks, the buds will swell with water and take on most of their harvest weight.

In general, after the light schedule changes, flowers mature in 6-12 weeks. Some strains of cannabis can flower for up to 4 months.

Identify Gender

Simply put, if you want to use your cannabis for its medical properties, then you will only want female plants. The male cannabis plant does not produce potent flowers, in fact it contains a much smaller amount of cannabinoids. Male plants can be eaten though; their leaves make a good addition to a salad, or you can steam them like spinach.

Sinsemilla is the name given to a female cannabis plant that has not been pollinated by a male plant. Female plants will produce seeds and less potent flower if this pollination occurs.

Unfertilized females have a much more potent bud high because of higher levels of THC. Instead of energy being used to make seeds, the female plant uses it to develop more potent buds.

If you choose not to use feminized seeds or clones, you will have to determine which plants are male or female.

An early sign of gender can be determined by looking at the point where the branches meet the stem, also called the node. Shortly after the bloom phase begins, male plants develop bell shaped pollen sacks. Males will develop pollen sacks before females to ensure cross pollination. It's very important to remove the male plants before they have a chance to fertilize the female ones.

Female plants will form small pairs of white pistils. Male plants form single green spurs at the branch node. A single male plant can fertilize hundreds of females very quickly once it releases its pollen. When outdoors, a male cannabis plant can pollinate females plants that are miles away.



Male Reproductive Organs (Pollen Sacks) on A Cannabis Plant



Female Reproductive Organs (Pistils) on A Cannabis Plant

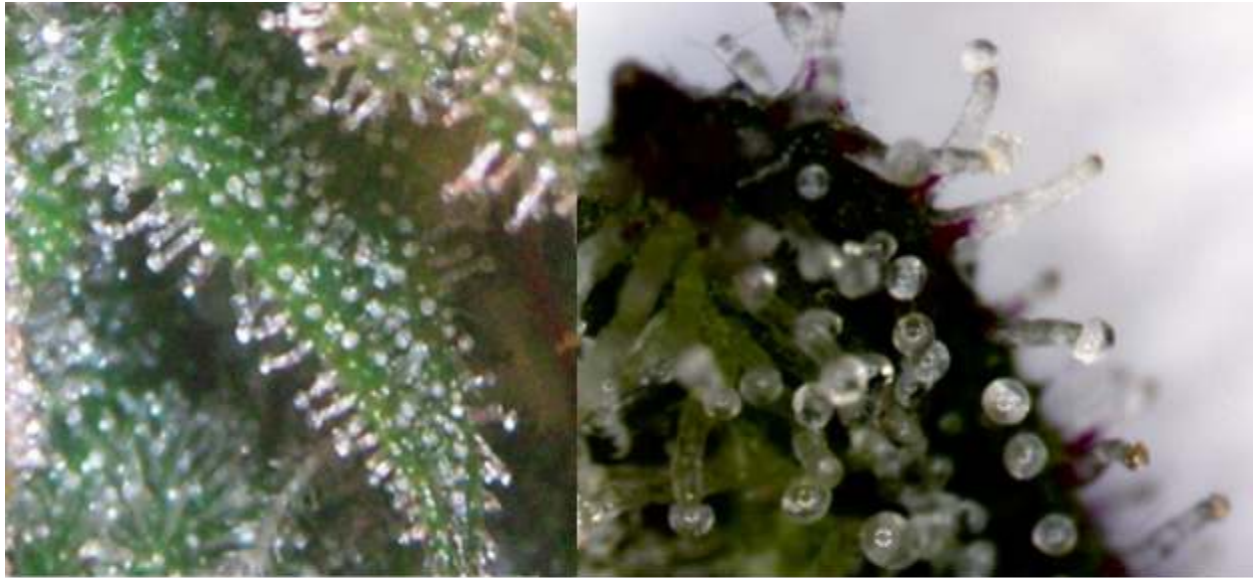
Leaching Soil For Harvest

When you have a good idea of when you will be harvesting the plant, you should leach the soil 1-3 weeks prior to the harvest.

Leaching the soil with clean water helps remove any buildup of fertilizer and salts in the soil. This buildup can potentially lead to a bad smell or taste. A lot of beginners miss this step and wonder why their bud tastes like chemicals.

There are several flushing products on the market, but using a very diluted full NPK fertilizer will also work. Leaching the soil is important for grows using synthetic fertilizers. Organic grows usually require less time to leach the soil and many organic growers won't leach at all.

Leach with double or triple the volume of water to the volume of the soil once a week.



Close Up Images of Trichomes on Cannabis Leaves

Harvest

You will want to harvest your female plants when THC production is at its peak. Not all buds will mature at the same time, higher buds are usually ready before buds on lower branches.

There are several ways to determine the potency of the flowers.

One way is visually. When the bud starts turning brown faster than the bud is growing, THC has already peaked and is dropping quickly.

A more accurate way to determine potency is by using an inexpensive jewelers handheld microscope. Your flowers will be covered with what are called trichomes, small resin glands that look like a stalk with a ball on top. The ball on top will go from clear, to cloudy (THC production has peaked), to brownish red.

When the bud has reached the appropriate point of maturity it should be clipped off and allowed to dry. You may harvest a plant in sections if you wish.

Pruning Fruiting Plants (lollypopping)

In the final stages of flowering, some growers will remove lower leaves and branches. By removing these leaves that aren't receiving much light, the plant focuses energy on

bud growth. This stresses the plant and allows the plant to use nutritional resources to swell up the buds. Pruning too many branches may damage your plant, research and caution should be used for this advanced technique.



Trimming and Drying

You may hang the entire plant to dry, or you can remove branches and let them hang to dry individually. The more stem that is left attached, the longer the drying process will take. Removing large leaves and branches will speed up the drying process.

You can tell when the buds are dry when the stems become brittle enough to snap instead of bend. Once the buds are dry they are ready to be cured.

If desired, keep the clipping from your plant (shake), these contain less THC but can be processed to make strong hash or other extracts.



Example of a Cannabis Flower Suffering from "Bud Rot"

Bud Rot

Hung buds that are left in too damp of an environment can begin to develop mold over time. Never smoke moldy cannabis buds, they can make you very sick. When trimming your bud, keep an eye out for dark brown or black patches of mold (bud rot).

Well developed bud rot is usually fluffy looking and will drop mold spores if not handled properly. Mold will move quickly through a harvest, so it's best to be cautious.

Bud rot is usually caused by moisture that's trapped inside the bud. Sometimes a small drop of water will get caught between the bud and the stem. Tucked in by the stem, this is where the rot starts.

In most cases you can safely cut out the bad spot and use the rest of the plant safely. Similar to cutting a brown spot off a fruit.

Two Ways to Dry

Stringing up your branches to dry is a classic and easy method for drying cannabis after harvest.

Find a spare space that is dry and tie some lines of string that you will hang your harvested branches on. When harvesting, keep in mind the buds will need a branch to hang from; don't cut the branches too short.

In your drying space, you should have a fan to help circulate the air. Don't aim the fan directly at the hanging buds, they might blow off.

As the buds dry, they will increase the humidity of the surrounding area. You will want to allow fresh air into the room everyday to manage this humidity.

Heating the room or using a dehumidifier is not recommended. The buds are covered in essential oils called terpenes. These terpenes are easily lost if the drying environment is too warm. Without terpenes your buds will lose flavor.

Another reason to allow your buds to dry slowly is the fact that the chlorophyll in the plant needs time to break down. Chlorophyll has a bad taste and causes the smoke to be rather harsh.

Again, Slow and low is the mantra here. For your plants to develop great flavour and potency they need to be left in the right environment..

The optimum environment for drying cannabis is 45-55% RH (Relative Humidity) and 15-21°C (60-70°F)

It will take 5-7 days for the buds to dry. When the stems can be snapped easily without bending, your harvest is ready for the curing process. Manicure buds by removing the remaining leaves and excess stem. Buds are then removed from the branches and placed in a glass jar to cure.

This is called a “dry trim”. There’s a neat trick where you can greatly reduce the amount of time it takes to trim the dry buds. Take the bushy buds and put them in a paper bag. Close the bag tightly and give it a good shake. This will quickly remove the dry brittle leaves around the buds. The leftover shake can be used to make hash or butter.



Rack Dry Method

Some growers like to trim their buds right off the branches before drying. This is called a “wet trim”.

The fresh buds should be left to dry as soon as possible. They should be placed on a breathable mesh as a single layer of buds.

A pile of fresh buds will quickly heat up and start rotting if they don't have enough airflow. Because manicuring buds is a labour intensive process, it may be a good idea to enlist the help of a few friends for this. Industrial trimming machines are also available but are quite expensive.

Manicured buds placed on some sort of breathable fabric can be left to dry before curing. There are [cannabis hanging racks](#) available online that work really well, you can also build your own rack system with some mesh.



Curing

For a good tasting bud and a more pleasurable smoking experience, curing is absolutely necessary. This is one step that makes the biggest difference to your final product.

Curing weed is simply done by placing your trimmed buds in a air tight container (like a mason jar) and opening it for 30 minutes twice a day to allow gas exchange.

Rolling the container carefully, while it's open, will help with this gas exchange. Store the curing jars in a cool dark place.

Over the span of several weeks, you should notice a dramatic change in smell and taste. After a month of curing your buds should be ready for consumption.

These buds can be smoked when not fully cured but they won't burn well or taste their very best.

You can continue the curing process for as long as you wish. Adding orange peels or apple slices to the curing jars will help enhance flavors and increase moisture if the buds get too dry.

Two way humidity packs (boveda) do a great job at maintaining the correct humidity levels in the jars which is around 62%RH.

Hash making

Hash can be made with the clippings (shake) left over from harvesting and manicuring. It's the whipped cream on top of your harvest sundae. Depending on how refined you decide to make your hash, you can produce a very strong product.

Hash is made by separating the trichomes from the plant matter in your trimmings (shake). The THC rich trichomes can then be heated and pressed to make bubble hash.



Bubble Hash Supplies and Ice Bath

Separating Trichomes

A common method of separating the trichomes is by using an ice bath with an agitator (like a washing machine).

At cold temperatures, the trichomes become brittle and fall off the plant matter. By using a series of micro-filter screens you can separate larger plant material from the very tiny trichomes.

The harvested trichrome residue is warmed up and then pressed into balls, cubes, or sheets. You now have a smokable bubble hash. This is a great extra treat to go with your bud harvest.

Basic Grow Timeline

Week 1-2

Step 1: Germinate seeds

Step 2: Place germinated seeds in small planters

Step 3: Keep medium moist until you have 3 or 5 nodes on the plant

Step 4: Transplant to a larger planter (5 gallon recommended)

Weeks 3-6 (veg cycle starts)

Step 5: Start feeding nutrients according to feeding schedule

Step 6: Slowly train the plant to make the best use of light and air

Weeks 7-15 (flower cycle starts)

Step 7: Once plant has reached just short of the desired size, switch to flowering light schedule (12/12)

Step 8: Start feeding you plant Bloom nutrients

Step 9: Monitor flower maturity

Step 10: Flush plants with plain water 2 weeks before harvest

Step 11: Start harvesting flower

Weeks 16-20 (Drying and Curing)

Step 12: Begin drying buds

Step 13: Once buds are dry, start the curing process

Week 21

Step 14: Enjoy the fruits of your harvest!

The entire process from seed to flower will take 5 to 6 months. 3 of those months are growing cannabis in a grow room. With good timing you could have 3 harvests in a year using only one grow tent.

Special Offer

Thanks again for joining our newsletter and reading our guide to cannabis cultivation. I'd like to give you a discount code for the nutrients we crafted to make growing cannabis easier than ever.

By following this guide and using our nutrients I'm confident you will have plenty of success if you've never grown before.



Save 10% when you buy the Reefertilizer bundle!
Type in this discount code during checkout.

Code: SGB10

Save 10% On Your First Order

**[Learn More About Reefertilizer
Nutrients!](#)**

Thank You

There you have it! The entire process of growing weed from seed to flower. This guide was meant to cover all the basics of growing marijuana. You should now have just enough knowledge for a successful first harvest. Thanks for taking the time to read this guide.

During your grow process you will likely come up with plenty of questions. Feel free to contact us and engage in the online community. It's filled with all types of growers from novices to experts.



Do you feel like you could improve this document?

Do you have any tips for beginner growers?

Are you interested in teaching others how to grow cannabis?

Please send us an email at info@reefertilizer.com



Photo courtesy of Concoction

Online Resources

www.Reddit.com/r/Microgrowery - wonderful online community filled with active members ready to answer your questions

www.reefertilizer.com/blog - a resource for growers with plenty of information on fertilizer and the growing process

www.canabiswiki.org - great blog that covers laws and news about the legalization of Cannabis

Special Thanks

u/GrowInTheDark

u/skoomd1

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Concoction - Olympus Genetics