

<https://www.omnicalculator.com/math/cylinder-volume>

This is a link for a calculator specifically for calculating the volume of a cylinder which I will need to do in order to calculate how much cement to use. Since I am making dumbbells with concrete cylinders on either side I will need to calculate how much cement to use and how much space it will take up. Odds are, the wet cement weights and the dry cement weights won't be identical but I am trying to get approximate weights that match up in a set. Also, I will probably make more than one set which is why having a calculator for this will be so helpful.

<https://www.hindawi.com/journals/ace/2014/836173/>

This is a detailed website about what percentage of weight is decreased from fiberglass reinforced concrete while it dries. This is important because like I said, I'm making weights and I would like them to be as exact as possible. I will need to do some algebra to figure out the weight I will need to use with wet cement so that I can more accurately get the amount I want for the dry dumbbells. This may be tedious but it is only one equation and I will only have to do it once for each set of dumbbells that I make.

<https://www.homedepot.com/p/Kleen-Kote-32-oz-Water-Based-Industrial-Concrete-Release-and-Anti-Corrosion-Coating-Spray-Bottle-30820/206965027>

This is a link for a product which acts as a sort of grease so that the cement doesn't stick to the mold that I am using. I'm thinking of using five gallon buckets which I will fill up with concrete, flip once dried and fill a second bucket which will be cut to accommodate space. This spray will make it so that I have to use less plastic resources since without this I will need two buckets per individual dumbbell. Hopefully this product will help me reduce the amount of waste that this project will take. This will make these weights not only affordable but low waste as well.

[https://www.autozone.com/paint-and-body/high-heat-paint/p/design-engineering-hi-temp-silicone-coating-aerosol-spray-12oz/720885\\_0\\_0](https://www.autozone.com/paint-and-body/high-heat-paint/p/design-engineering-hi-temp-silicone-coating-aerosol-spray-12oz/720885_0_0)

This is a product that I will use for the finished product that will help the weights look, feel, and function better. It is a silicon coating spray which will act as the outside layer of the dumbbell and will also help give the handle a little extra grip which will really help functionality. I think this will also help protect the dumbbell from shattering incase it falls or takes some other form of impact. I am already going to use fiberglass reinforced concrete which will help it stay together in general but I think a layer or two of silicon will absorb some impact for the dumbbell.

[https://en.wikipedia.org/wiki/Fiber-reinforced\\_concrete](https://en.wikipedia.org/wiki/Fiber-reinforced_concrete)

This is just a wikipedia article detailing what fiberglass reinforced concrete is and how it was first invented and what it was originally used for. I will be using fiberglass reinforced concrete over regular concrete since it is far more likely that regular concrete will crack and shatter then reinforced concrete. This is actually a very old concept as Greeks used horsehair and straw in mud bricks so they would hold better. Before fiberglass, asbestos was used in concrete for the same reasons. I'm not too worried about the brand for this product and that is why I have the wikipedia page instead of a link for an actual product.

<https://www.homedepot.com/b/Plumbing-Pipe-Fittings-Pipe-PVC-Pipe/1/N-5yc1vZ1z18i41Z1z1b2ty>

This is another link which is just showing the home depot page for pvc pipes, specifically ones that measure 1 inch in circumference. These will act as the handles for my dumbbells and although they aren't very strong they are cheap, hollow, and it is easy to get a good grip on them. Since it is not a very strong product I will be filling the hollow tube with concrete which will help strengthen it. Also, if I am able to make a homemade bench or some other sort of seat used for weightlifting I would use a very similar method as it is easy to put together and strong when concrete is in it.

<https://www.garagegymreviews.com/diy-concrete-dumbbells>

This is a guide on how to make a product which is kind of similar to what I am intending on making but there are a few key differences. First of all I'm pretty sure he is using a mold that he is getting online while I will use a bucket and measure how much to put into it. Also, there are metal handles and he has no cover layer so there is nothing on the outside really holding it together in case of cracks. These dumbbells are also pretty big, I plan on eventually making large ones for my home gym but my prototype will be nowhere near as big.

[https://www.youtube.com/watch?v=9fH\\_J3O2LIY&ab\\_channel=FixItWithJerry](https://www.youtube.com/watch?v=9fH_J3O2LIY&ab_channel=FixItWithJerry)

This is a youtube video about somebody else making homemade dumbbells and I really like this one because the entire process remains organized. He also has material that is coating the dumbbell which I like because it would make it easier to remove the dried concrete from the mold. Also, there is a nice design for a dumbbell rack which could be cool and I would love to make but it might be too much money to make. All around I like how this guy made his dumbbells and I would like at least my process to look similar to how he did this.

<https://strengthambassadors.com/blog/an-easy-beginner-dumbbell-workout-for-women/>

This is a guide for a couple of workouts that you could do using the dumbbells which I will use to make my own guide as that would be great for the project. The website says that these exercises are specifically for women but I do a lot of these exercises and generalizations like this shouldn't be made in fitness. I'm planning on putting a guide that is as short as possible because I don't want people to be overwhelmed by an access to information all at once. With this knowledge people will be able to exercise at low effort and at a low cost.

[https://www.youtube.com/watch?v=v2vLQiU8lJQ&ab\\_channel=ACHVPEAK](https://www.youtube.com/watch?v=v2vLQiU8lJQ&ab_channel=ACHVPEAK)

This is a video on how to train your upper body with dumbbells which is usually what a lot of people like training best. Also, in this video there are probably a couple clips I could use just as an example to show beginners. This again will be useful for the guide I am making for the dumbbells so the fact that it is all dumbbell exercises is very helpful to me. I think that I will show the information separated into upper and lower body as some people usually hold their upper body to be their favorite and for a lot of other people they almost only train their lower body.