Principles of Training of Any Kind

There are many parallels in the basic rules in all forms of training, whether it be resistance training, studying, or skill practicing. In each case, the goal is to drive adaptations to improve oneself in a certain measurable variable like strength, test scores, or accuracy. Because the body and the mind adapt in order to adjust to stimuli but are hindered by fatigue, the following principles apply. In my explanations, I primarily used examples from lifting because I believe they're easier to understand.

1. **Consistency is number 1.** None of the remaining principles matter if you don't train regularly. This is so vital that it practically defines the way a beginner should train: since beginners are new to training, they need to develop consistency first and foremost. Developing consistency is generally catalyzed by making the training easy and not a big time commitment. After the beginner stage, your consistency will be dialed in (i.e., training will be like a habit to you), and we can focus on other factors.
2. **Increasing stimulus drives adaptations.** In order to make improvements, you must make your training progressively harder over time—for lifting, this looks like adding weight, reps, or sets to a certain exercise. If you don't, your progress will stagnate since your training will become unsatisfactory for stimulus after some time. This time after which your training becomes stale varies wildly based on training experience and what you're training for.
    a. **There are two basic training variables that constitute stimulus—volume and intensity.** Volume is how much training you do, and intensity is how hard you train. I like to think about stimulus this way: Volume*Intensity = Stimulus. If you do zero volume, you get zero stimulus. Similarly if you do zero intensity. Bodybuilders will generally use the number of sets for volume and RPE (rate of perceived exertion, a rating of effort from 1-10) for intensity. Powerlifters will typically use volume calculated by Weight*Reps*Sets and an intensity defined by %1RM (if my one rep max is 100lbs, and I use 80lbs for a set, the intensity is 80%1RM).

3. **Always track your progress.** Otherwise, how will you know you've improved? First, it takes a huge improvement to be able to tell that you've improved just by sight or feeling. Therefore, tracking your progress helps you see smaller improvements—and whether or not you're making them. This second serves as motivation to keep going. Third, you won't know how to increase the stimulus of your training if you don't know what the stimulus is in the first place. For example, you can't know how many reps you should do this week if you don't know how many you did last week.
4. **An accurate judgment of stimulus requires technique to stay consistent.** If you cheat, the stimulus will be lower than you think; i.e., one cheated rep or one problem for which you peeked at the solution will give less stimulus than if you didn't cheat. Therefore, you should never consider a cheated stimulus equal to a regular stimulus.
5. **Everyone has a limit.** At a certain point, adding more training will harm your progress. This is because of fatigue. Everything that gives a stimulus also gives fatigue, and your body/mind can only handle so much fatigue before it stops making adaptations. The typical solution to this is taking a break called a deload. A deload involves taking a week off from training or slashing your training volume for a week, and its purpose is to clear the fatigue out of your system. This is just like taking a vacation from work.
6. **Performance is skill minus fatigue.** In your training, the goal is to increase your skill, the time derivative of which is proportional to stimulus. But with any training stimulus, fatigue is accumulated. Your recovery (~negative time derivative of fatigue) will always be outpaced by the accumulation of fatigue in any good training program. Accumulation of fatigue will eventually outpace the accumulation of skill, and your performance will begin to worsen. This phenomenon is known as overreaching, and if extended over a long period of time (several months or years) becomes overtraining. Overreaching is fine, but you never want to do it for too long since high fatigue lowers your capacity to make adaptations (and besides, a decreased performance means you lift less weight, so of course the stimulus is worse). This is the reason you might want to deload.
7. **There is a maximum rate at which you can make adaptations.** You will have to find this through trial and error. For example, people who lift 3 hours a day are hardly any bigger

than those who lift 2 hours a day, even though they may receive more stimulus. Be aware that this rate will slow down as you get more advanced. For example, a lifter who gained 1 pound of muscle per month as a novice will likely gain 1 pound of muscle per year as an advanced lifter.

8. **Interference.** Training for one skill may interfere with training for something else, so progress is inhibited for both endeavors. Depending on how you manage the two, one will probably be prioritized over the other even though progress in both is slowed. This interference has little effect when training for one of the two skills is minimal. For example, you may train for bodybuilding and endurance running at the same time, but progress on each will be slowed. However, around 30 minutes of endurance running per day won't slash your gains.
9. **Prioritization may be necessary.** At a certain point in your training (many years of training in most cases), you will become advanced enough that you cannot train everything with equal emphasis and expect timely results. Therefore, you should emphasize some aspects and put the rest on the back burners. For example, an advanced bodybuilder may spend a year emphasizing shoulder training to bring up his shoulders. Or a guitar player may spend days practicing a select piece of a song before moving on to the next piece. Also, you may value one skill over another, so you'll have to prioritize if both skills are reasonably advanced.
    a. **How to prioritize:** train the priority/priorities first, and give them more volume and higher intensity. As for everything else, train them afterward, giving them less volume and lower intensity, but enough of both to maintain them.
    b. **For 2 non-overlapping skills:** If, for example, Physics Olympiad is more important to you than endurance running, then place your Physics Olympiad study sessions before your endurance running sessions. Also, consider dialing it back on endurance running so that you can dial it in on Physics Olympiad. Even though these two things are non-overlapping skills, the mental fatigue of one training session can interfere with the other session, hence the importance of training your priorities first.