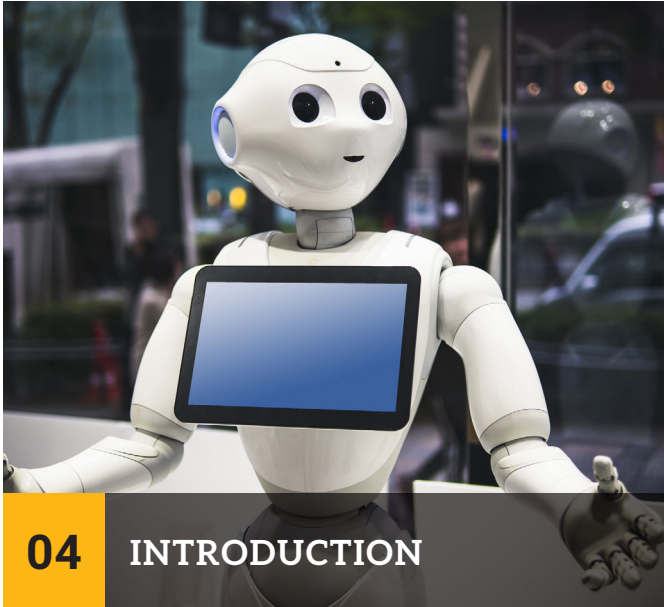


COMPLETE ROBOT BUYERS GUIDE



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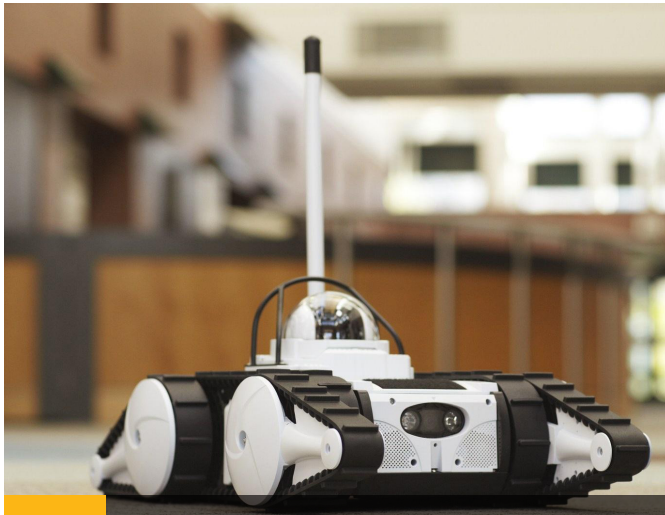
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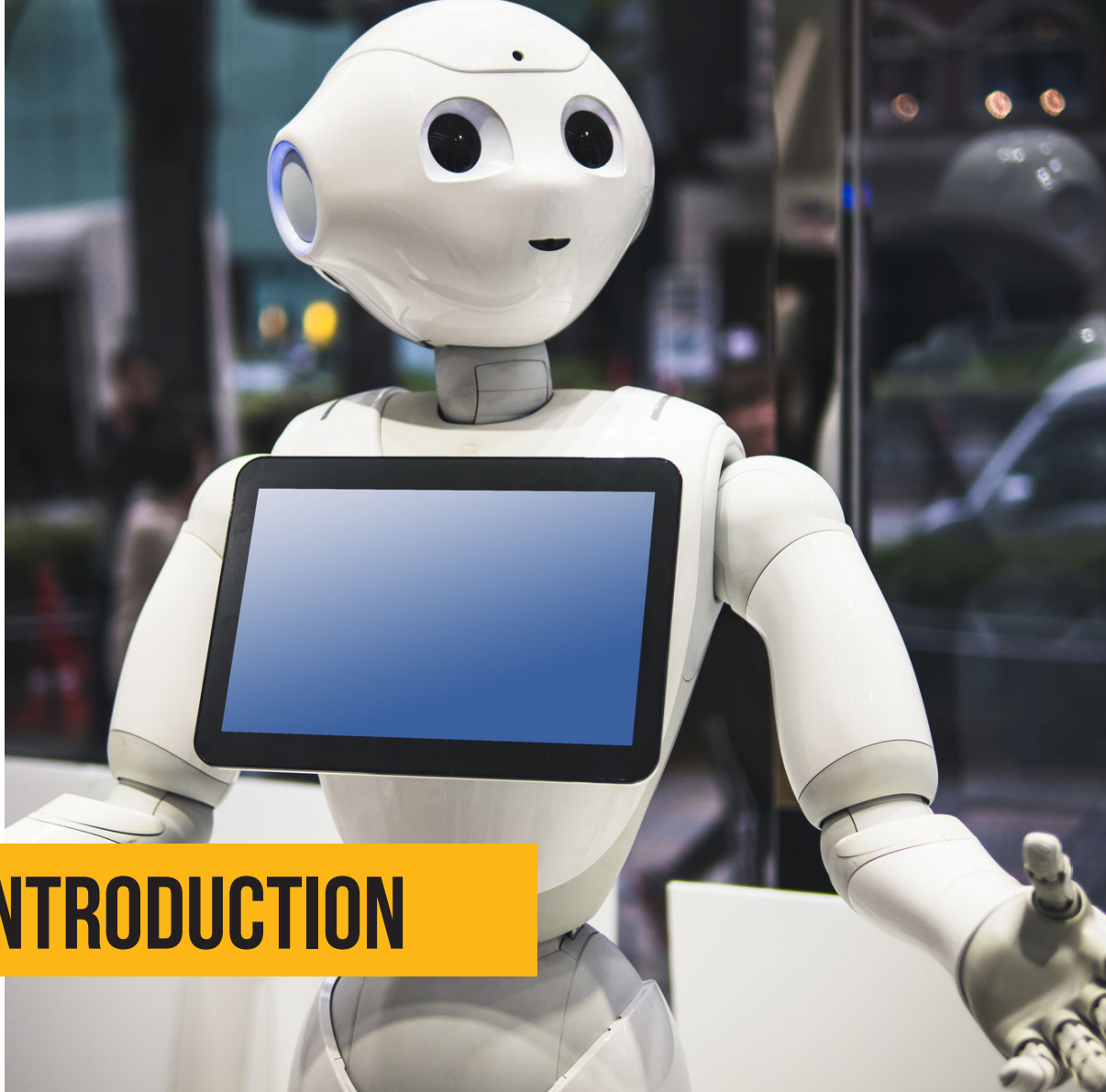
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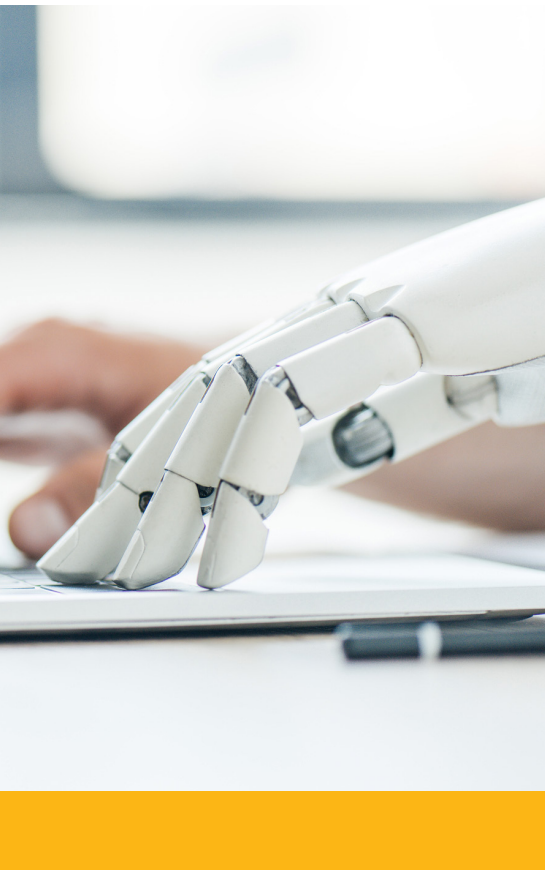
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INTRODUCTION



Whether you are looking for a little robot helper to ease the pressure on the household chores or just a gift for a loved one that will engage and educate at the same time, we are here to help.

In this book, the Little Robot Shop team has collated loads of information to help you make an informed decision about what to spend your money on and gauge what you can realistically expect for your budget.

In section one we take a close look at some of the most popular household robots you can buy today. Our buying guides will give you a brief overview of how the robot works as well as some key features to consider when deciding which robot is right for you. We will also be sharing some simple

maintenance tips to help your robot last as long as possible and finally some budget recommendations.

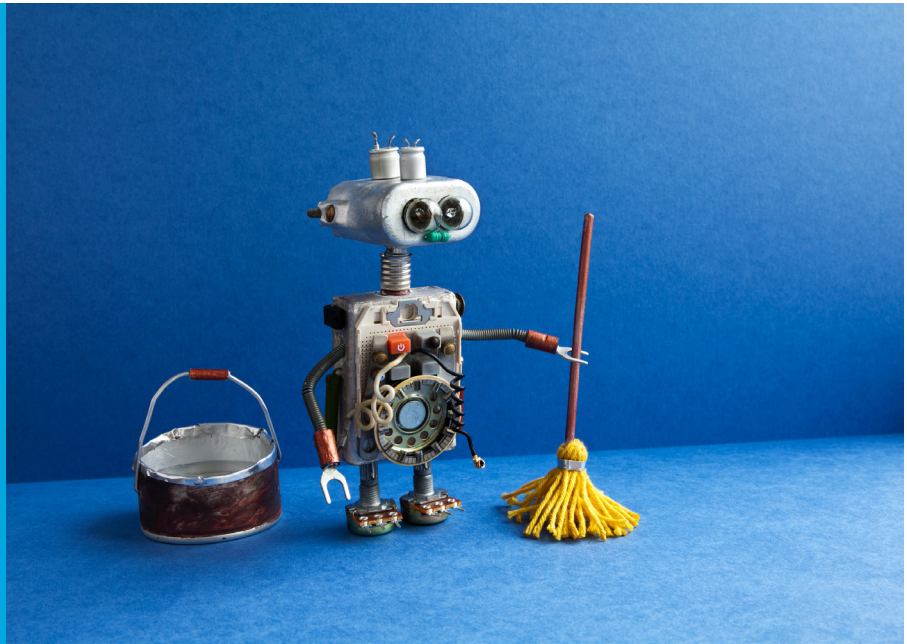
In part two we move on to robots for kids. Robot toys make amazing presents for babies, all the way through to children in their late teens. We have broken down by age the kind of toys that make incredible gifts based on the child's development and the skills that they will be learning throughout their lives. So whether you are looking for something that can help a toddler with their fine motor skills or a programmable robot kit to encourage your teenage tinkerer to be the new Elon Musk, we have the skills covered.

So with that said let's get to the good stuff.

PART ONE - HOUSEHOLD ROBOTS

CHAPTER 1

ROBOT VACUUM CLEANERS BUYING GUIDE



A robot vacuum cleaner is an intelligent machine that uses a vacuum cleaning system to automatically clean and mop the floors of your home. They are programmed to clean without the help or supervision of humans. With a push-button or remote control from a smartphone app/Wi-Fi or Bluetooth, these gadgets will go on to do a very efficient cleaning job.

How do robot vacuum cleaners work?



All robot vacuum cleaners operate virtually the same way, involving three basic operations, except for some robot vacuum cleaners which have a mop function as well. To clean your house, a robot vacuum cleaner will go through the following stages in the same order.

First, the sweeping or spinning brushes will capture dirt and all types of debris, hair, food particles, fur, etc. These brushes (usually two) bring both large and small debris from different corners and edges to the rolling brush in the center.

Next, the rolling brush (either one or two, depending on the design) will remove the debris and bristles from the floor.

Finally, its powerful motor will suck very tiny dirt particles into the filtered bin through the air inlet while the High-Efficiency Particulate Air filter (HEPA filter) will remove dust and dirt particles from the air.

But that's not all because a robot vacuum cleaner with a mopping function will go one step further. It will gradually dispense liquid from its water tank to a microfiber cloth and scrub the floor with this damp cloth to remove any smudges.

Key features an ideal robot vacuum cleaner must have

Wi-Fi app control: This feature gives you the convenience of controlling the robot from an app on your smartphone. You can also monitor the robot through the app and receive notifications from it when you're away from home.

Obstacles avoidance: If your home is furnished there will be obstacles in the robot's cleaning path. The 'obstacle avoidance' feature enables the robot to identify items such as sofas, tables, wall edges, stairs, etc. and, with the help of sensors, move away from them.

Intelligent navigation: Robot vacuum cleaners with this feature use Artificial Intelligence (AI) to make a map of a room and divide it into cleaning zones for more efficient cleaning. With this, the robot can navigate smoothly while a GPS memory enables it to remember where it has cleaned and where to go to next. This means the robot gets the job done without your supervision.

Scheduling cleaning: This feature lets you schedule specific cleaning times. With a pre-set cleaning time, the robot will automatically get to work once it's time to clean, even in your absence.



Recharging dock: Robot vacuum cleaners work with batteries and so need to be charged regularly. A recharging dock in a robot cleaner is an incredible feature because this means that the robot can automatically go and recharge itself before it runs out of power. All you have to do is select a space that the robot can easily access and it will always go there for a recharge.

HEPA filter: High-Efficiency Particulate Air filters remove very tiny dust, dirt particles, and allergens from the air. If you have pets, then this is a good feature to look for in a robot cleaner.

Virtual walls: The 'virtual walls' feature in a robot allows you to determine the exact place(s) you want the robot to clean. It literally lets you build virtual walls around the areas you want cleaned as the robot can't go past your invisible walls.

Bin size: The bin size of robot vacuum cleaners vary. A larger bin will mean a bigger robot but it's often more convenient and will save you needing to empty the bin too frequently.



How to choose the best robot for your home

When shopping for a robot cleaner, answering the following questions will help you narrow down your search and make the right choice.

Do you have a big house with many rooms?

Robot vacuum cleaners are built with certain capabilities; some are built to clean very large areas while others work better in small environments. If you have a very spacious house with many rooms, look for a robot that's specifically designed to clean large spaces and multiple rooms.

Do you have carpets, tiles or hardwoods in the house?

Some robots clean only specific surface types. Though most robots can clean tiles and wood flooring without hassle, carpets pose more of a challenge. If this is what you have then make sure the robot you get is specially designed to clean carpets.

Do you spend much time at work and very little time at home?

If yes, you may prefer a robot cleaner with a scheduling cleaning function.

Do you have pets?

If yes, then consider a robot vacuum cleaner with HEPA filters.

Do you want a cleaner able to scrub floors?

Look for a robot cleaner with a mop function.

Do you want to have separate areas for cleaning?

You will need a cleaner that allows you to set virtual walls around your chosen areas.

How much do robot vacuum cleaners cost?

Prices of robot vacuum cleaners vary greatly depending on its smart features.

Robot cleaners under \$200 – budget model

Robot vacuum cleaners in this group do a pretty good job of cleaning the floors of your home but don't expect smart features like intelligent navigation, Wi-Fi connectivity, scheduled cleaning, virtual walls or recharging dock. These are mostly simple robots so you'll have to push a button and monitor them while they clean.

Robot cleaners between \$200 to \$400 – mid-range model

Mid-range robots will offer long cleaning times and large bins but you still can't expect to get any sophisticated functions.

Robot cleaners above \$500 – premium model

Some premium robots cost well above \$800 but you definitely get what you pay for. Robot cleaners with sophisticated and AI function fall into this category.



How to maintain robot vacuum cleaners

Properly maintaining your robot vacuum cleaner will help it last longer; below are some maintenance tips for you.

1. Some of the common filters are washable; save money by not buying replacements so frequently.
2. Empty and clean the removable bin by taking it out and rinsing underwater.
3. These robots need to be used in temperatures between 14°F (-10°C) and 122°F (50°C); this is because the electronic components do not work beyond this range.
4. You need to clean the robot vacuum cleaner every once in a while to prevent dust interfering with the robot's sensor (make sure you turn off the power first).
5. Using the robot vacuum cleaner outdoors is not recommended because exposure to sun and rain may damage the robot and reduce its lifespan.
6. Make sure you always recharge your robot and use only the recommended charging device. Do not use other devices to charge it so you don't shorten its battery life.

And finally on maintenance, you may have to replace these things at times. This will help you get the most life out of your robot vacuum cleaner.

Battery: replace after 2 years.

Bin: replace when needed.

Brushes: replace every 6 months.

Filters: replace every 3 to 6 months.

Sensors: replace after 2 years.

What is the life expectancy of robot vacuum cleaners?

With proper maintenance, you can expect your robot vacuum cleaner to last for around 4 to 6 years. Another factor that greatly contributes to the robot's lifespan is sturdy build quality (don't expect a cheaply-built robot to last as long).

Limitations of robot vacuum cleaners

1. These robots come with parts that can be replaced after a while but replacements can be expensive.
2. Some cleaning robots cannot comfortably access under furniture (they can get stuck) and therefore can't effectively clean these areas.
3. Robot vacuum cleaners need regular maintenance (such as emptying the bin). Those with small bins will need to be emptied after every cleaning session.
4. You have to remember to recharge your robot, especially if it doesn't have the automatic recharging feature.
5. Robot vacuum cleaners with all the very convenient and useful features are expensive.

Conclusion . . . should you buy a robot vacuum cleaner?

If you want to save labor and time on house chores (they never seem to finish), you definitely should consider getting a robot vacuum cleaner to help you sweep and scrub the floor. These days, a robot cleaner isn't just a luxury – for increasing numbers of people these gadgets are very necessary in a home.

They won't magically make your house chores go away but they will tremendously help you maintain a neat and healthy home. Of course, the robot cleaner you eventually buy will depend on your budget but even those below \$200 will help to get your home cleaner.



CHAPTER 2

ROBOT WINDOW CLEANERS BUYING GUIDE



Robot window cleaners are smart machines designed to clean windows. These machines stick to windows using either a motor-powered suction or magnetic connectivity; they combine automated movement with window cleaning technology and clean a whole window from edge to edge.

How do robot window cleaners work?

All robot window cleaners are basically the same, they come with microfiber cleaning pads (or cleaning brushes), a cleaning solution, a power adapter for charging the device and safety cord which keeps the robot from falling.

To clean windows, a window cleaning robot will go through the following steps. First you're required to spray some cleaning solution on to the microfiber cleaning pad before placing the robot on the window pane. Some advanced robots can automate the process of spraying cleaning solution on to the cleaning pads.

Next, the robot window cleaner will start its movement from one edge of

the window to the other, systematically cleaning the entire surface of the window. Some have a drying feature such as a squeegee or an absorbent pad to ensure that the window is streak-free. And when the robot has finished the job, it alerts you by playing an audible tone.

Robot window cleaners are simple gadgets and very easy to operate. You're only required to apply the cleaning solution, place the machine on the window and remove it after it is done. Some of these machines can do more than clean windows, they clean other surfaces such as shower walls, doors and mirrors.



Key features an ideal robot window cleaner must have

Battery life

These machines need power to work which a battery supplies. The battery life of window cleaning robots usually lasts from under 15 minutes to more than 30 minutes, but for most robots the battery can allow them clean up to 10 windows on a single charge.

Remote controls

A remote control allows you to control the robot's movement around the window. With remote access you can fully maneuver the robot so you can change its direction or make the gadget go back to clean a spot again or make it stop.

Automated controls

Automation gives you the luxury of sitting back while your windows are cleaned, but unfortunately not all window cleaning robots have this feature. Robot window cleaners with automated control ensure the microfiber pads are moistened with cleaning solution. The squeegee absorbs waterborne dirt from the windowpane, sponges the glass surface thoroughly and allows efficient drying



Motor-powered suction or magnetic connectivity

Robots can stay attached to the pane without falling off by using either a motor-powered suction or magnetic connectivity. Robots with motor-powered suction are able to generate a suction which keeps it attached to the window while those using magnetic connection will require that you place a second magnet on the other side of the window.

Power cord

Window cleaning robots come with power cords connected to them, some of these cords are up to 16 ft long to cover all your needs. Some also come with extensions.

Back-up power

Some window cleaning robots come with a UPS system, allowing the robot to function during a power failure. Despite being very temporal, the back-up battery ensures safety and extends performance.

A smart drive system

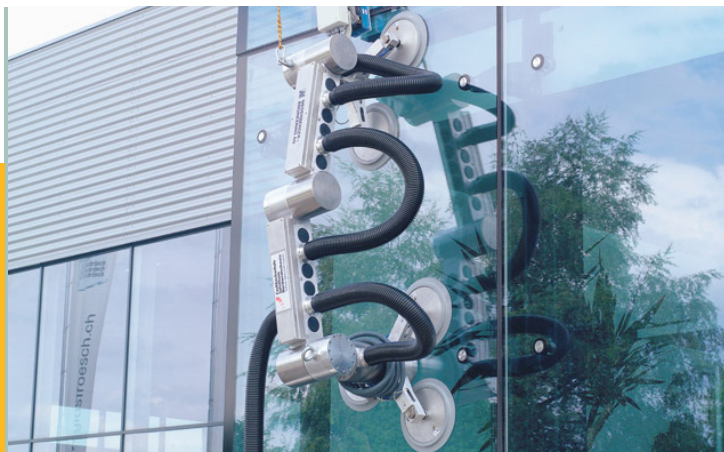
A smart navigation system (engineered with built-in sensors) enables the robot to map the dimensions of the window frames before cleaning and also to choose the most convenient cleaning path. And edge detection technology means the robot can detect the edges of the window.

Safety tether

Sometimes the suction force may fail to keep the robot firmly attached to the window surface and in such cases, the robot will fall. A safety tether prevents it from hitting the ground.

Spare parts

Some of these gadgets come with spare parts such as cleaning pads. It's very important that such a device comes with spare parts when you buy it or have parts that are readily available for easy replacement.



How to choose the best robot window cleaner for your home

When shopping for a robot window cleaner, answering the following questions will help you narrow down your search and make the right choice.



Will you prefer a circular or square device?

While window cleaning robots do a good job of cleaning windows, some may not be able to clean the edges perfectly. Robots with circular brushes can miss the square edges of your window, while a square device may better clean these corners.

Are your windows made of delicate glass?

If you have windows with delicate glass, then beware of robot window cleaners with very powerful suction force because this may be too harsh and possibly cause damage.

Do you have extra tall windows?

For extra wall windows you may want to get a robot which uses a magnetic connectivity because they tend to have a stronger attachment than a motor pump and therefore are less likely to fall off. Also look for a robot which is cordless or has a cord which is long enough to properly clean your windows.

Do you have large and wide windows?

For very large and wide windows, look for a robot designed to work on such windows and has a long-lasting battery life to sustain it.

Are your windows framed or unframed?

While some robots can work on both framed and unframed windows, some others are more specific. Also some robots are best for glass windows and mirrored panels while some are best suited for mullioned panels. These little facts are important to consider and will help you make a better choice.

Will you prefer an automated window cleaner?

With an automated window cleaning robot you will only need to attach and remove the robot from the window and recharge the battery when it's low.

Will you prefer a robot with a motor-powered suction?

If you have smooth and straight windows then a motor-powered window cleaning robot will work fine for you. But if your windows aren't very smooth the robot may not be able to attach itself firmly to the surface because the motor suction relies on maintaining a tight air seal.

How much do robot window cleaners cost?

Robot cleaners under \$160 – budget model

Window cleaning robots in this class are usually priced from \$99 to \$159 and are basic models without remote control features.

Robot cleaners between \$170 to \$300 – mid-range model

Models with more features can be purchased from \$175 to \$300.

Robot cleaners above \$350 – premium model

The most advanced window cleaning robots cost between \$350 and \$500. Robots in this class come with all the exciting features such as advanced sensors, both remote and automated control, much longer battery life, faster-working gadgets and some have built-in water tanks, etc.

How to maintain robot window cleaners

Just like any other machine, good maintenance practices will help it last longer and the same goes for window cleaning robots. The following tips will help you keep your robot in good shape.

1. Do use your robot window cleaners during the cold seasons because they are built to work in temperatures above 40 degree Fahrenheit. If you must use it during spring, do this only on dry and sunny days. Due to the design of these gadgets, using them in humid weather can cause system damage and malfunction.
2. Use the robot only for the type of surface and cleaning it was built for, don't try to experiment or push the robot beyond its limit.
3. Make sure you wash the cleaning pads at least once a week, depending on how often you clean, and also change the cleaning solution regularly.
4. If your device has a safety tether always attach it properly to avoid a possible crash.

5. When in use, make sure you monitor the safety pad and harness system so as to avoid tangles.

What is the life expectancy of robot window cleaners?

With proper maintenance, you can expect your robot window cleaner to last for between 3 to 5 years. A robot that has a sturdy build will last longer and perform better than a cheaply-built one.

Limitations of robot window cleaners

1. Robots with motor-powered suction come with safety cords to prevent them from hitting the ground when they fall. But sometimes this tether can be short and will require you to frequently move it, especially when cleaning large windows.
2. Some robot window cleaners cannot work on all types of windows; some limitations in the design of these gadgets lets them work only on specific types of windows and surfaces.
3. Some of these gadgets have very short battery lives and need to be recharged after cleaning about 10 windows. If you have a big house with many windows to clean, this may not be very convenient.
4. Robots with magnetic traction require you to attach a magnetic part of the robot on the opposite side of your windowpane which may be difficult in some cases.

Conclusion . . . should you buy a robot window cleaner?

Just like any other robot, window cleaning robots are not exactly cheap. But the big question is, should you invest in one?

Well, that depends! If you have windows that extend to very high parts of the building, then a window cleaning robot will definitely be worth the money because you probably don't want to climb that high and risk a fatal fall.

Alternatively, if you don't exactly have tall windows but instead your windows are very wide, then the robot will save you the time and energy you'd have spent in cleaning. And if you simply dread cleaning windows . . . robots are there to help you keep your windows clean with minimal effort.





CHAPTER 3

ROBOT POOL CLEANERS BUYING GUIDE

An automated pool cleaner is a vacuum cleaner designed to clean swimming pools with very little human supervision. Pool cleaners collect debris and sediment from swimming pools; they also use advanced brushing technology to scrub the sides and edges of the pool, including walls and steps.

Major types of pool cleaners

There are basically three types of pool cleaners:

- ▶ Suction side pool cleaners
- ▶ Pressure side pool cleaners
- ▶ Robotic pool cleaners

How do pool cleaners work?

The different types of pool cleaner basically clean swimming pools, but there are different cleaning methods.

Suction side pool cleaners

The suction side pool cleaner works by hooking up to the skimmer or suction line of a pool. The force of the water pumped out of the pool's skimmer or drains helps it to move around the pool's floor. While moving around the pool, this cleaner sucks up debris and sends it through the pool's filtration system. It picks

up mostly small and medium debris. Some models of suction side cleaners have wheels and can climb walls, while others have rubber disks that lay flat against your pool floor.

Pressure side pool cleaners

The pressure side pool cleaner hooks up to the return-jet in a pool and the pressure from this concentrated stream of water moves the cleaner along. The force of the water also loosens debris, pushing it up into the filter bag. Fine particles will also flow through the filter bag and get cleaned out in the pool filtration system. Pressure side pool cleaners usually have wheels, a filter bag (although some don't have these), a sweep hose, a return-jet hose, and they can pick up medium and large debris.

Robot pool cleaners

Robot pool cleaners are driven by an electric motor

that comes with its own pump and filters to collect debris from the pool. It's like a pool vacuum cleaner that can clean the walls, floor and steps of your swimming pool.

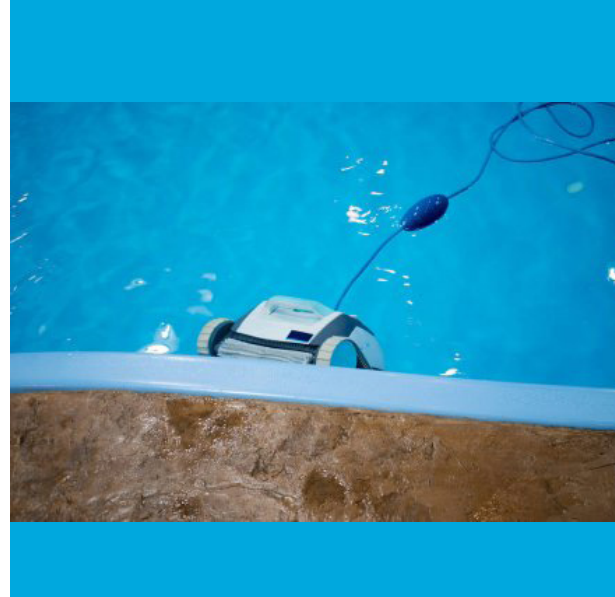
These pool cleaners plug into the regular household power outlet and, like robot vacuum cleaners, the pool robot moves around the pool sucking in debris and locking it inside the machine.

The robot's filters ensure that clean water is circulated back into the pool. Most robotic pool cleaners are propelled either by wheels or tracks and they have rotating brushes that dislodge algae and stubborn dirt.

There are two major types of robot pool cleaners; the above-ground and in-ground. The difference between them is that the in-ground pool robot is designed to climb walls, steps and slopes while the above-ground pool robot isn't capable of performing such functions.

How robot pool cleaners differ from other automated pool cleaners

The major difference between robot pool cleaners and other automatic pool cleaners, is that the pool robot is a smart machine and uses artificial intelligence. The pool robot has electronic sensors and processing abilities



that the other automated pool cleaners lack. Many pool bots will scan the pool and determine the most efficient way to clean the pool in the least amount of time. Some advanced models will have memory systems and will constantly update their data to improve their capabilities each time they work.

Key features an ideal pool cleaner should have

Short cleaning time

An efficient pool cleaner should do its job quickly so your pool can be swim-ready when you want it. That's why you should look for an automated pool cleaner with a short cleaning cycle; your pool cleaner shouldn't take more than 3 or 4 hours for a complete clean.

Smart navigation system

A smart navigation system improves the efficiency of a pool cleaner. Bluetooth, sensors, and gyroscopes allows the pool cleaner to move in a logical, time-saving way.

Powerful brush system

A pool cleaner with a powerful brush system will not only collect debris but will remove stubborn grime from the floor and walls of your pool.

Timer

Some pool robots come with timers so you can set your robotic cleaner to run on its own without supervision. You can also set the timer to start a cleaning cycle once a day, two times or three times a week; this depends on the robot's design.

Easy controls

The ideal pool cleaner should have simple controls that are easy to operate. Some advanced pool cleaners come with a remote control or allow you to install an app on your smartphone to control it.



Filtration system

Some automated pool cleaners don't have a filter but a filter system is important. Pool cleaners that solely rely on a pool's filter system may quickly damage it. Many robotic pool cleaners come with more than one type of filter, so they can tackle fine and coarse debris.

Replaceable parts

After a few years of cleaning your pool, your robot will need some parts to be replaced. Parts such as brushes, filters, bags and power cords are some of the items that take on heavy wear and tear and they should be easy to replace.

Tangle-free power cord

Pool robots come with power cords. This cord should be long enough for your pool and it should have swiveling ability to prevent tangling.

How to choose the best robot pool cleaners for your home

Before you buy a pool cleaner, answering the following questions will help you narrow down your search and make the right choice.

What type of pool cleaner do you want?

The first big question to answer is whether you want a suction side, pressure side or robot pool cleaner.

What is the type and size of your pool?

This is an obvious one because you definitely need a cleaner that is best suited for your own pool. Don't just assume that the pool cleaner will clean your pool; find out if it's designed specifically for the type and size of pool you have.

What cleaning features should the pool cleaner have?

Robotic pool cleaners clean by scrubbing the floor of a pool with heavy-duty brushes and use a powerful vacuum to suck up debris while other pool cleaners mainly just scoop up medium and small debris.

Do you want a smartphone app and Wi-Fi connectivity?

These features are specific to pool robots. Robotic pool cleaners come equipped with features that enable you to use your smartphone which lets you activate them remotely. Provided you have a Wi-Fi connection you can control them from anywhere.

Would you like a 'programming and scheduling' feature?

This is another feature specific to robot pool cleaners. The programming feature lets you decide where or how long the robot should clean and with the scheduling option you can schedule the robot to clean at a set time.

How much do pool cleaners cost?

Automatic pool cleaners can range in prices from \$100 to over \$1000.

Pool cleaners under \$300 – budget model

Within this price range, you can get some automated pool cleaners like the suction side cleaners, pressure side pool cleaners and some basic robotic pool cleaners (especially for small above-ground pools).

Pool cleaners between \$300 to \$800 – mid-range model

There are some efficient pool cleaners (including suction and pressure side cleaners and some mid-range pool robots) within this price range.

Pool cleaners above \$800 – premium model

The most sophisticated pool cleaners cost more than \$800. Pool cleaners (especially for big in-ground pools) with this price tag come with many advanced features.



How to maintain pool cleaners

Routine cleaning and maintenance is the only way to make sure your pool cleaner will last long but this isn't difficult. With these simple tips, you can maintain your pool cleaner.

1. After every cleaning cycle make sure you remove your pool cleaner from the pool, remove the filter bag or canister and wash it with a hose to dislodge any stuck dirt particles.
2. Always check for wear and tear and quickly replace any worn out parts.
3. Always check the brushes, drive tracks and filters after every cleaning.
4. Replace worn brushes as soon as possible to maintain the proper cleaning power.

What is the life expectancy of pool cleaners?

If you properly maintain your pool cleaner, expect it to last for up to 6 years. If the pool cleaner has a solid build it could last for up to 8 to 10 years.

Limitations of pool cleaners

1. Pool cleaners need regular maintenance which costs some time and money.
2. Robot pool cleaners come with an electric cord and if this isn't long enough it can limit the robot's mobility.
3. Some pool cleaners aren't able to gather large floating debris from the water.
4. Pool cleaners that rely solely on a pool's filter system to grab debris can clog and wear out the pool's filter. To prevent this you will always need to clean your pool's filter, which may be inconvenient.
5. While some pool cleaning robots have a navigation system that helps them move smartly through a pool, some others can get stuck in corners.

Conclusion . . . should you buy a pool cleaner?

Dirty swimming pools are no fun and if you want a way to keep your pool clean without getting your hands dirty then you need a good pool cleaner. By investing in an automated pool cleaner, you will give yourself more time to enjoy your pool.



CHAPTER 4

ROBOT LAWN MOWERS BUYING GUIDE

Robot lawn mowers are smart machines designed to mow a lawn with very little human input. They usually have wheels for navigating through the lawn, use rotating blades to reduce grass to an even height and can recognize lawn edges and obstacles without supervision.



How do robot lawn mowers work?

Before a robot lawn mower goes to work on a lawn it has to be installed. During the installation process, a perimeter (or boundary) wire is placed around the edges of the lawn in a continuous loop to completely encircle it, and around permanent obstacles such as flower beds, trees, and ponds.

The two edges of the perimeter wire will connect to the charging station of the robot. This wire helps the robot create a complete map of the lawn; the robot senses the wire and will use it to detect the edges of the lawn and areas where there are flowers and trees.

After the installation process, the robot will go to work. Robot lawn mowers use short blades to clip and mulch grass, they reduce the cut grass to fine clippings and scatter them around the lawn.

These robots work in a random fashion so they don't leave track marks on the lawn. Besides the boundary wire, they also have collision sensors so they can detect obstacles in their way and move to another direction.

Once it has completely mown the lawn or the battery drops to a certain level, it will return to the charging dock for a recharge. After recharging its battery, it either returns to the work (if the lawn isn't completely mown yet) or stays put for next time.



Key features an ideal robot lawn mower must have

Smart navigation

While robot lawn mowers randomly move around while mowing the lawn, others come with GPS for smart navigation. This helps the robot keep track of the areas it has mowed so this feature makes the robot smarter and more efficient.

Obstacle avoidance

Not all obstacles will be marked out with a boundary wire, especially temporary obstacles such as a fallen tree branch or a toy. This is why the robot lawn mower has collision sensors to help it detect an obstacle. With the collision sensor, the robot is able to detect temporary obstacles and move away from them.

Automated controls

Robot lawn mowers come with automated controls so you can program them. You can schedule cutting times or adjust the cutting height from the control panel. Some advanced models have Wi-Fi and Bluetooth connectivity so you can remotely control the robot. Also, some newer models come with mobile apps from which you can monitor and control your lawn bot.

Charging dock

These gadgets come with batteries that need recharging from time to time. The batteries of robot lawn mowers take about an hour to charge which enables it to work for a few hours. When the battery drops to a certain level, the robot automatically stops working and drives back to its charging station.

Adjustable cutting height

Robot lawn mowers come with height adjustment settings which allows you to determine how short the grass will be when the robot cuts it. Cutting height ranges are usually 20mm ($\frac{3}{4}$ inch) to 60mm ($2\frac{1}{4}$ inches) and you can set your preferred height from the control panel or a mobile app.

Weatherproof

Most lawn mowing robots are water-resistant and weatherproof so they can continue working even when it's raining. They cut wet grass as well as dry grass efficiently. Those designs that don't work in the rain have moisture sensors, returning to their docking station when it is raining and restarting the grass-cutting when it's dry.



Weather timer

This feature is seen in very advanced robot mowers; it enables the robot to adjust its grass cutting schedule to the current weather condition. If the weather favors rapid grass growth, the mower will mow more frequently and if the grass is growing slowly, it will mow less often. This feature also helps it detect when it rained heavily and the ground is very soft so it doesn't drive on to the lawn and leave ugly track marks on it.

Slope tolerance

Any robot can drive through a flat land but what if your lawn is steep? This is why most robot lawn mowers are slope tolerant. They can comfortably drive-through and mow a steep lawn but each model has a specific slope angle it can tolerate. Most lawn bots can manage slopes of 25% (14o) while premium models can climb slopes of up to 45% (25o).

NB: the grade is a percentage of the rise of the measured slope while the slope angle is a measure of the angle of inclination of the slope to the horizontal.

Password and alarm system

These are security features that are included with most robot mowers. The alarm system helps prevent theft while the password feature gives just you (and anyone else you want to share it with) access to your robot, so nobody else can control it.



How to choose the best robot lawn mower for your home

What's the size of your lawn?

The first thing to consider when choosing a lawn mower is the size of your lawn. A small lawn that is just beside your house will need a robot that is specially designed for that type of space while a much bigger lawn will, not surprisingly, require a robot mower specifically designed to mow large lawns.

Is your lawn complex with narrow passages?

While choosing a lawn robot, it's important to consider the landscape features of your lawn. Does it have lots of flower beds and very narrow passages? If it does, then you may need a robot with the 'Narrow Passage' feature. This means the lawn bot recognizes these narrow passages independently and will calculate the best route to mow this area efficiently. Or you can go for a lawn bot with a boundary wire for mapping out different sections and passages.

How efficient is the mower?

This takes into account the robot power and how efficiently it can do the work. Most premium robot lawn mowers are programmable and can work with a set schedule. When it's time to cut, the robot will leave its charging station by itself and start mowing, then travel back to its dock when it needs a recharge.

Does your lawn have slopes and steep areas?

If you don't have slopes then you can go for a robot designed just for flat land but if you do have slopes and steep land then you need a robot that's built for it. Such a robot should have a powerful motor, excellent battery life and heavy-duty wheels for good traction.

What security system does the robot have?

You don't want to leave this out because your robot will be exposed most of the time and you don't want to risk losing it to some unscrupulous individual. Make sure it's equipped with a pin code or password lock, an alarm system and maybe a GPS tracker. Some lawn bots have user-controlled theft protection which includes a disabling system.

Are the controls intuitive?

You really don't want a robot mower which requires a robotic engineering degree to operate. The instructions should be clear with the controls intuitive and easy to navigate.

How safe is the lawn robot?

If you have pets and children then you would naturally be concerned about their safety and that of your lawn mowing robot. Although robot lawn mowers are generally safe because their blades are hidden, it's still important to check for safety features. Some models have a cutting disc with retractable blades while others have a child guard feature to prevent children from operating it.

What's the battery life?

You also want to think of how long it will take the robot to recharge its battery and how much grass it can cut on a full charge. Many robotic mowers use the new lithium-ion battery technology which means that they can recharge in under an hour and work for some hours before needing another recharge. If you have a small lawn, your lawn bot should be able to cut the entire lawn on one charge.

How much do robot lawn mowers cost?

Robot lawn mowers are expensive machines and prices usually start at approximately \$500, but premium models for very big lawns can cost up to \$3500.

Robot lawn mowers between \$500 to \$900 the most affordable models which can mow lawns of around 400sq m.

Premium models can cost more than \$3000 as they come with many useful features and can cover huge surface areas of around 5000sq m.



How to maintain robot lawn mowers

Fortunately, robot mowers do not require a lot of maintenance which makes them easy machines to manage. But you still need to do a few things to keep it in good shape.

1. You will need to replace the battery every 3-5 years depending on usage and the battery capacity. You can tell when your battery needs to be replaced as the cutting time will significantly decrease.
2. You will need to clean the underside of your robot mower every few weeks to remove grass clippings.
3. You will need to replace the blades once or twice a year (or according to the manufacturer's recommendations) to ensure that you are getting the best out of your robot mower.

What is the life expectancy of robot lawn mowers?

With proper maintenance and since all parts are replaceable, you can expect your robot lawn mower to last for up to 15 to 20 years. On average, it will probably last for 10 years.

Limitations of robot lawn mowers

Just like many other robots, these powerful machines have some limitations.

1. The boundary wire can be broken by burrowing animals or gardening activities (but this can be fixed).
2. Most robot lawn mowers don't cut the edges of the lawn perfectly. They will leave a narrow strip of uncut grass at the edges which you will need to trim manually if you want a neat edge.
3. Robot lawn mowers work slowly and their batteries don't last very long which means they have to return to the charging station a few times before completing the entire lawn (depending on its size).
4. Lawn bots can get stuck in holes or on some objects which may have been left out on the lawn.
5. If your robot mower breaks down, finding a technician to fix it can be difficult and the cost of repair is usually higher than that of regular lawn mowers.

Conclusion . . . should you buy a robot lawn mower?

Robot lawn mowers are generally known to be very expensive so it probably depends on how much you enjoy mowing your lawn. A robot mower costs less than \$25 a year in operating costs and if you've been paying landscapers to maintain your lawn then you'll be saving significant amounts of money.



CHAPTER 5

OTHER ROBOT HELP

If you're happy with a robot vacuuming your floor, cleaning your windows, mowing your lawn and cleaning your pool so you don't have to do any of these tedious and boring chores yourself, then there are a few more robots you'll be interested in.

How would you like a robot to clean your gutters, secure your home, keep you or an elderly member of your family company, entertain and educate your kids? Or even a robot butler? Yes, there are robots for virtually everything, from completing necessary and boring house chores to providing entertainment and security.

There are hundreds of home robots currently available which makes identifying the best one for you a challenge. But here you will find some with the essential features that each specific robot should have.



ROBOT MOPS

Mopping is one of those chores that has to be done frequently but no-one particularly enjoys doing it. Is that surprising? Seriously, who likes buckets full of filthy water and dirty mop fibers? But does anyone really have to go through this arduous task just to get the floors looking neat and spotless? Not when there is a robot to do it without any complaints! With the endless list of chores always waiting to be done, a robot mop will certainly make life much easier by giving you one less thing to worry about. Robot mops will do all your mopping, from toilet floors to kitchen and bedrooms, and all you have to do is fill up the tank, press start, and let them do their thing.

Quick tips for buying

Long battery life: An ideal robot mop should have a battery life of about 90 minutes and lithium-ion batteries are the best.

Solid navigation capabilities: These robots have sensors to help them independently navigate around your furniture and avoid bumping into walls. Premium models can map out a room and store cleaning routes.

Easy to set up: Set-up is an important factor to consider and the simpler it is, the better. These robots require that you charge them, fill the water tank, change the microfilter cleaning pads, program time and date so you want to check these processes are as simple as possible. Some even come with apps so you can control them from your smartphone.

Performance: You want a simple machine that will actually do what it claims, so the robot should clean various surfaces and



the microfiber cloth should pick up lots of grime. And it should support scheduled cleaning so you can program it to clean when you're busy with something else.

Multiple cleaning modes: A robot that can switch between cleaning modes like wet mopping, damp sweeping and dry sweeping is more useful and many models can do this. Spot cleaning is also great because with this feature the robot can clean just the spot where something spilled.

How much do robot mops cost?

You can buy a robot mop from around \$150 to more than \$500. Of course, you'd expect the more expensive models to be more sophisticated and have extra features.

HOME SECURITY ROBOT

If you've ever felt anxious about the security of your home while away on a trip or felt like you forgot to lock your doors and windows properly, then you probably need some form of home security so this type of robot is an excellent option. Unlike traditional security cameras which may have blind spots and can't capture the entire house, a mobile security robot patrols your home from room to room providing effective video surveillance of the entire house from different positions. Some of these robots have built-in microphones letting you listen to what's happening in your home. Security robots can transmit audio and video to your smartphones using Wi-Fi connectivity. With such a device at home, you'll be able to know what's going on in your house from anywhere which will give you peace of mind and help you relax knowing that your place is safe.

Quick tips for buying

HD camera and live streaming: A high-quality camera will ensure that the video footage captured is of high resolution which will act as a clear evidence in case someone breaks in. With a live streaming feature, you will have a live view of the area monitored by the robot.

Motion detection: With motion detection feature, a robot can sense a disturbance or an unusual movement in your home and alert you through a push notification sent to your smartphone so you can check-in and see what's happening in real-time. These robots usually come with a mobile app.

Facial recognition: This feature is important because it will enable the robot to know when the homeowner or a family member is approaching. This can be great to help prevent false alarms.



Decent battery life with self-charging: Decent battery life and self-charging are features that boost the effectiveness of a robot security camera. With a strong battery the robot will last longer and when the battery drops a certain level it will go for a recharge. You don't want to check your robot home security only to find out that it's not functioning because its battery is dead as that totally defeats its purpose.

Night vision: A robot that will help you keep watch at night and capture any disturbance which is important because most break-ins happen at night.

How much do home security robots cost?

You can expect to get a decent home security robot for less than \$100, while very sophisticated models are more expensive and can cost up to \$1000.



TELEPRESENCE ROBOTS

Have you ever wished you could be in more than one place at once? Welcome to the world of telepresence robots! With one of these you can be present at a place without actually going there because it gives you a virtual presence. Imagine working on a project with colleagues in California while you're actually somewhere in Europe. With a telepresence robot you can move around the office in California, talk to your colleagues, help out with the project, and they won't miss you because you're working with them even if you're not actually there. These robots have video-cameras, screens, speakers and microphones for interacting with people and they're controlled from a computer, smartphone or tablet. You simply log on to your robot avatar via the internet and move through your remote office, interacting and working with your colleagues.

Quick tips for buying

Solid battery life: If you'll be working with a telepresence robot then its battery should be able to last an entire eight-hour workday if needed, and you should be able to recharge it yourself via a charging dock.

Dual-band Wi-Fi support: These robots only work with internet connections, therefore a solid connection is essential and it should have dual-band Wi-Fi support (for both the 2.4 GHz and 5 GHz bands).

High-resolution cameras: High-resolution cameras with great video quality will produce clear and bright images of your remote office and co-workers. Wide-angle cameras are also very important so you can have a wide enough viewing angle; at least 90 degrees is great so you can see more of your environment and more easily navigate around objects.

Excellent two-way audio: A telepresence robot with multiple speakers and microphones provides excellent two-way audio transmission. With this, you will be able to hear your colleagues clearly, and they too will hear you.

Good navigation: Even though these robots can't exactly navigate an entire office building without help, you still want one with good navigation. Obstacle avoidance sensors and downward-facing cameras will help you see what's in your path and help you better navigate through obstacles.

How much do telepresence robots cost?

These robots aren't cheap, probably because they're designed mainly for corporate, medical and academic institutions. The cheapest models cost about \$400 while some others cost from \$1000 to more than \$5000 with an annual subscription fee of about \$400.

Companion robots

Companion robots are designed to take the daily tasks that make your life more stressful off your hands. They will help



you with day-to-day household tasks such as ordering items online, reminding you of upcoming appointments, medication schedules or birthdays, entertaining you with music, movies, and photo slideshows, telling kids fun stories, reacting to emergencies, and much more.

These cool robots will make your home run more efficiently, giving you less to worry about and making your life easier. They are designed to interact with humans in a natural and intuitive way. They can move, speak and reply to questions and are great for elderly or disabled people, or anyone who needs help around the house (and who doesn't?).

Quick tips for buying

Easy to set up and use: These robots can do many different things so you really want a simple one with intuitive controls and a small learning curve. You don't want to spend endless hours browsing through a confusing set of instructions in a manual before being able to install and use your robot.

Battery life: This goes without saying, strong battery life is always very important in robots and decent battery life makes them more effective and useful. The ideal companion robot shouldn't just have an excellent battery life but should be able to recharge itself in a charging dock.

Face and voice recognition: An in-home companion robot should be able to recognize the faces and voices of the house occupants, or at least the face and voice of its owner.

Wi-Fi and Bluetooth connectivity: This makes controlling the robot easy and you'll be able to control it from different locations.

Versatile assistance functions: These robots have varied functions. They can play with your kids, help you keep to your schedule, project movies and play songs, manage your household chores, patrol your home to keep it safe and secure from intruders and so much more.

How much do companion robots cost?

You can get a reliable in-home companion robot from anywhere between \$60 to \$800.



GUTTER CLEANING ROBOTS

It's important to clean your gutters but that doesn't make it a pleasant task. Every once in awhile, you'll have to get on a ladder to clean out the gutters, this is both daunting and risky. And it's much worse if you have trees which are taller than your house. But with a gutter cleaning robot, this will be one less chore to worry about. A gutter cleaning robot drives through the gutter using an auger with soft spinning blades to break up clogs and dislodge debris and brushes to sweep up any tiny bits of debris. This device has a remote control and once you place it in a gutter you'll be able to control its movement as it cleans up the gutter. You'll still have to climb that ladder to place it in your gutter but once it's there just let it do its thing.

Quick tips for buying

Easy to use and control: A gutter cleaning robot should be intuitive and easy to operate with a remote control to allow you to easily operate and use the robot.

Easy to maintain: Properly maintaining a robot helps it last longer and gutter cleaning robots are no different. It should be easy to clean with regular cleaning solution and a wet cloth after every use.

Decent battery life: It's important that the robot can comfortably clean your gutter in one charge. You don't want to stop mid-clean to recharge the batteries as that would be very inconvenient. Once fully charged, the battery should last for a full cleaning cycle.

Compact and reliable: The robot should be small enough to comfortably fit in and move through the gutters without getting stuck, and it should also do a good job of unclogging and cleaning debris from gutters.

Safe and secure: A convenient security feature that will protect against theft is important in case someone forgot to put it away. You also don't want a device that will create problems and possibly damage your gutter.

How much do gutter cleaning robots cost?

You can get a reliable gutter cleaning robot that'll do a good job and make your life easier from about \$100 to \$300.

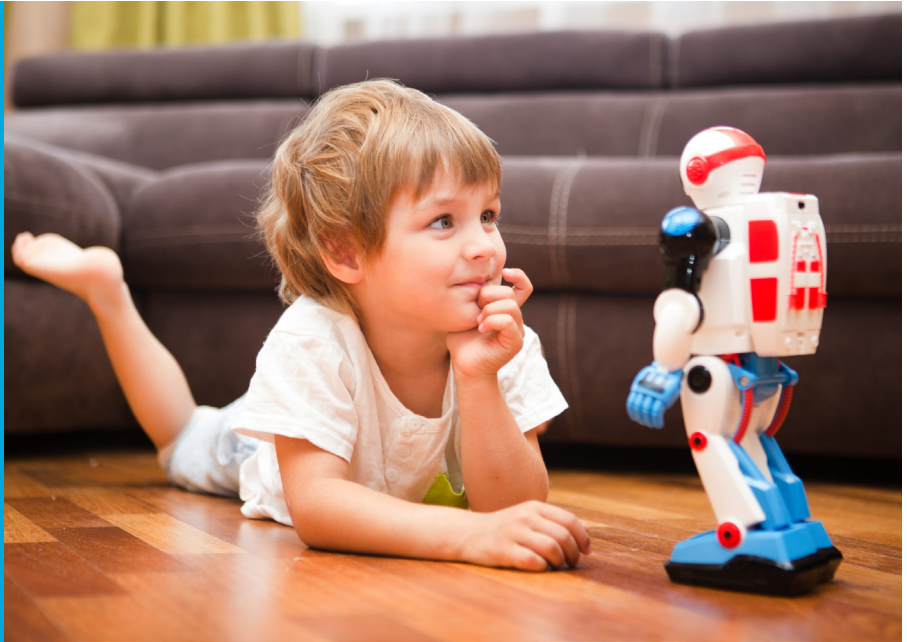
Conclusion

You no longer have to be tied down by petty chores and tasks because robots are here to help. Having them tackling chores and helping to manage your home will free you up to live a much fuller life.



PART TWO - ROBOT TOYS FOR CHILDREN OF ALL AGES

ROBOTS AND CODING TOYS FOR KIDS



We've come to an age where robots are becoming a bigger part of our lives. We have robots in our homes to help us keep things going and in order, we have robots in industries, hospitals and business places for completing repetitive tasks. So it makes sense that educational robots for children are becoming a more common sight, helping as interactive tools in schools and classrooms.

There are also educational robots that you can get for your young ones to play with and learn at home. As the world around us changes, the chances are the jobs that your kids will be doing in the future haven't even been created yet, but they will almost certainly be related to technology. Giving them fun and educational toys to play with from a young age will help them to acquire those essential science and technological skills they will need for successful careers as adults.

How robotic toys can help children develop

Kids learn best when they are intrigued and captivated and learning with educational robots, whether in classrooms or at home, helps to make this possible.

Learning with a coding toy stimulates young minds, keeps children engaged and helps them to learn at their own pace without feeling pushed or resentful. And it's likely they won't even realize how much they are learning because they'll be having so much fun.

Most robotic and coding toys also introduce kids to STEM elements (Science, Technology, Engineering, and Mathematics). They break down complex information into basic concepts. Toys such as Wonder Workshop's

Dash Robot can really help to develop young minds, both in classrooms and at home, and here are some other ways they can make a difference to any child's education.

Educational robots encourage teamwork and collaboration

Robots not only help kids to improve academically, but they also help them to develop valuable life skills such as teamwork and interaction with those around them. Learning with educational robots requires kids to work together on certain tasks, which encourages collaboration and social interaction in the classroom.

Collaborating with colleagues is a skill that is required in almost any corporate institution and learning this skill at a young age will help kids to be better prepared for adult life. Working together as a team will also teach them how to deal effectively with conflict, respect the other person's opinion, build self-esteem and confidence.



Educational robots support creativity and imaginative reasoning

Children are very creative with active imaginations which can be developed further through educational robots posing exciting and interesting problems and puzzles to solve in entertaining and engaging ways. Since the mind is like a muscle that is strengthened with every use, flexing the mind by completing tasks and solving problems will help to build creativity and imaginative reasoning.

Educational robots keep kids engaged and they're great for STEM learning

It's not unusual for kids to get bored during lessons but while learning and playing with robots, this is less likely to happen. Robots keep kids fascinated and engaged; they make learning fun so kids feel they are being entertained rather than trying to learn some boring subject.

These robots introduce kids to many science, technology, engineering and mathematics concepts in a fun and interactive way. Even toddlers and preschoolers enjoy learning with a robot and they never seem to get enough of it.

WHAT IS STEM?

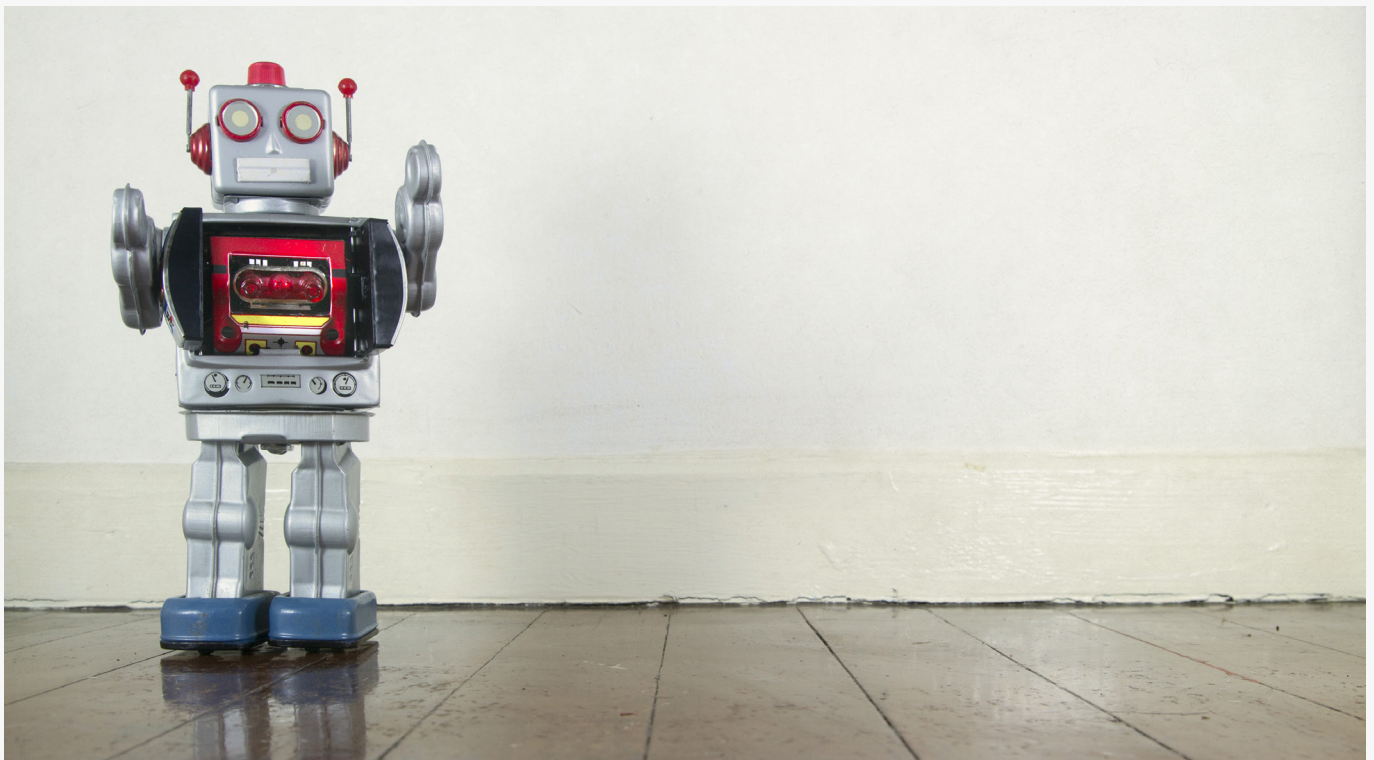
STEM is an educational concept that stands for Science, Technology, Engineering, and Mathematics and balancing education through play in these four specific disciplines. It integrates them rather than teaching them as separate subjects.

STEM education for kids is important because it touches every aspect of their lives and provides them with practical applications of real-life events in easily digestible lessons.

Science is seen in virtually everything around us. Technology now affects every part of our daily lives and will continue to expand into every aspect of our lives. Engineering covers the basis of designs and construction of building, bridges, complex structures, etc. And almost every career part involves some form of mathematics, even simple daily activities like shopping and managing our finances still involve basic arithmetic.

Here's how STEM education can help kids;

1. With STEM, kids get to analyze problems and figure out how to efficiently solve these problems themselves. This helps them build problem-solving skills.
2. In this modern age, computers and technology are really cool things and kids find them interesting. STEM integrates this into its learning programs so the kids will find learning interesting.
3. STEM education allows kids the freedom to be creative and express themselves. This encourages them to put their imagination and reasoning faculties to use.
4. STEM education helps kids become better prepared for the technological innovations they will inevitably experience in their lifetime.
5. STEM learning helps kids build a solid foundation and prepares them for a career in a related field.



HOW TO CHOOSE A TOY FOR CHILDREN



BABIES

Key skills being developed by babies (0 to 2 years)

Fine motor skills: Learning to coordinate and use the muscles of the wrist, fingers and eyes is one of the very first skills that babies master. If you observe a baby trying to pick up and hold a small object with his/her fingers, you will see that this activity helps them to gain control of the muscles in their hands. This is an important skill that helps babies to synchronize hands and fingers with their eyes and gain complex dexterity. By the age of 2, most toddlers can paint with their fingers, scribble with crayons and stack small objects.

Gross motor skills: Babies also struggle to gain control of larger body muscles such as those in their legs, feet, and arms. While mastering these gross motor skills, babies will start to become more mobile and you can see them struggling to crawl or stand up and walk. Often babies can walk without falling down by their first birthday and, by age 2, with much stronger muscles and better gross motor skills, they usually can jump, run, kick a ball around and perhaps navigate stairs.

Speech and language skills: A few months after they are born, babies start to make some noises which can sound like words and have some of the rhythms of speech. Babies grow and develop at different rates but by their second birthday, many will be saying distinct words and short sentences, with a vocabulary of about 50 words.



Key skills traits that toys for babies should have

Babies love objects that give them something to practice with and fine-tune their new skills. Robot toys with the following features are great for helping babies develop some key skills faster.

It should make sounds: A baby's hearing is fully developed at birth and in the first few months of his/her life, the toys they will enjoy most are those that make sounds such as simple rhythms, songs or that read and say simple words. This is an important feature for toys because babies learn to talk by repeating what they hear, so robot toys that can read simple stories or say soothing words to them are great, this will keep them engaged and help their language skill development.

It should have bright colors and high-contrast patterns: Attractive bright colors and contrasting patterns appeal to babies. Toys with these characteristics will help a baby pick out different shapes and patterns and before long he/she can identify shapes and colors.

It should be able to move: Babies are delighted by objects that can make sounds and move around. They are always happy to

follow with their eyes (if they're still too young to move) or by crawling or walking, which will help them stay engaged while practicing and developing gross motor skills. If the baby is less than 5 months old and is yet to start sitting up or crawling then a dangling toy will also do the trick.

It should spark their imagination: Babies and toddlers have very active imaginations, so an ideal robot toy for babies and toddlers should stimulate that by providing a variety of tunes, pictures, and promote imaginative play.

It should help develop fine motor skills: One of the first things babies learn to do is control the small muscles of the wrist and fingers by grasping and holding small objects. It's important that a toy helps them to develop this skill and an ideal toy should help improve a baby's concentration, hand-eye coordination, arm movement, and promote dexterity.

It should be small enough for the baby: Babies are born with the instinct to grab things but they still need to be able to control their muscles efficiently and some toys help them do this. If you dangle a toy in front of a baby you will see them reach for it. A baby needs a toy that is small enough to hold and lift.

Safety tips for buying toys for babies

The safety of your little one is paramount and you don't want to put him/her in any form of danger so make sure that a robot toy is absolutely right.

1. It must be made of non-toxic materials and lead-free paint. This is essential because your baby will have a lot of contact with this toy and almost certainly put it in his/her mouth.
2. Make sure the toy is big enough so if the baby puts it in its mouth it is not a choking hazard. Toys with very small parts are very dangerous for babies.
3. Beware of toys containing button batteries or magnets because kids can mistakenly swallow these parts. If the toy uses non-rechargeable batteries then it should have a secure battery casing which is screwed shut.
4. It should not have sharp or pointed edges, especially as babies like to bring things to their faces.
5. The sound level of the toy should not be too loud because excessive noise can damage a baby's sensitive hearing. Many toys now come with volume control for adjusting the sound level.
6. They should be made of long-lasting materials and be able to survive impact.
7. Don't buy toys (for children below 3 years) with small or loose parts that can be unscrewed and come unattached.
8. Make sure the toys you buy for a baby specifically states it is suitable for the baby's age group and abilities because toys for older children are not safe for younger age groups.



TODDLERS

Key skills being developed by toddlers (2 to 4 years)

Hand and finger skills: As a child grows he/she will gradually begin to gain dexterity by mastering more hand and finger skills. By the age of 3, children can turn the pages of a book, wash their hands, draw a circle or football with a crayon or pencil and they will hold the pencil or crayon with their fingers, not their fists. Some preschoolers can go as far as screwing and unscrewing a lid, and drawing a person with 2 to 4 body parts. And as they continue to tune their gross and fine motor skills they will be able to take their clothes off without assistance.

Speech and language skills: By their third birthday, most children have mastered speaking up to 300 words and they are able to understand even more. They can usually put simple words together and make complete sentences. They will become more chatty and often ask questions such as “why do birds fly?” while 4-year-olds can also tell short stories.

Pre-reading skills: Children usually don't learn to read or write until they are older but they can start to build a vocabulary and

recognize simple words such as cat, dog, pet and run. They'll also be able to substitute words in rhyming patterns and write letters and numbers.

Cognitive ability: 3 and 4-year-olds are usually very curious and will ask a lot of questions. At this age, they start to build a memory, their mind and imagination will be very active. They can recognize many things such as people's faces, names, colors, shapes and time of day.



Handling emotions: Children start to understand and manage their emotions around this age and they will also begin to see how their actions affect others. As they start to understand emotions, they can get overwhelmed and frustrated, especially when they find themselves in a stressful situation. This is when temper tantrums may occur as they struggle to communicate their feelings.

Social skills: As children grow from toddlers to 3 and 4-year-olds, they'll start to interact and play with other children, some even have best friends. These early interactions will tend to be bumpy because they're still learning how to properly build a relationship.

Key skills traits that toys for 2 to 4-year-olds should have

Fine motor skills: Toys that encourage kids to make coordinated movements with their hands, fingers, eyes, and mind are great for improving fine motor skills.

Cooperative play: As children learn to interact with other kids, building friendships and social skills, a toy that provides for cooperative play will help them learn about cooperation and working as a team. At first, they will need an adult to help them understand how to work together but after a few sessions they would be more confident about coordination.

Solving puzzles and overcoming challenges: An educational robot for children should be able to provide enough problems and challenges to help them flex their minds and cognitive muscles. Solving puzzles and working on problems is a great way to turn a child's boundless energy, and sometimes frustration, into creativity and innovation.

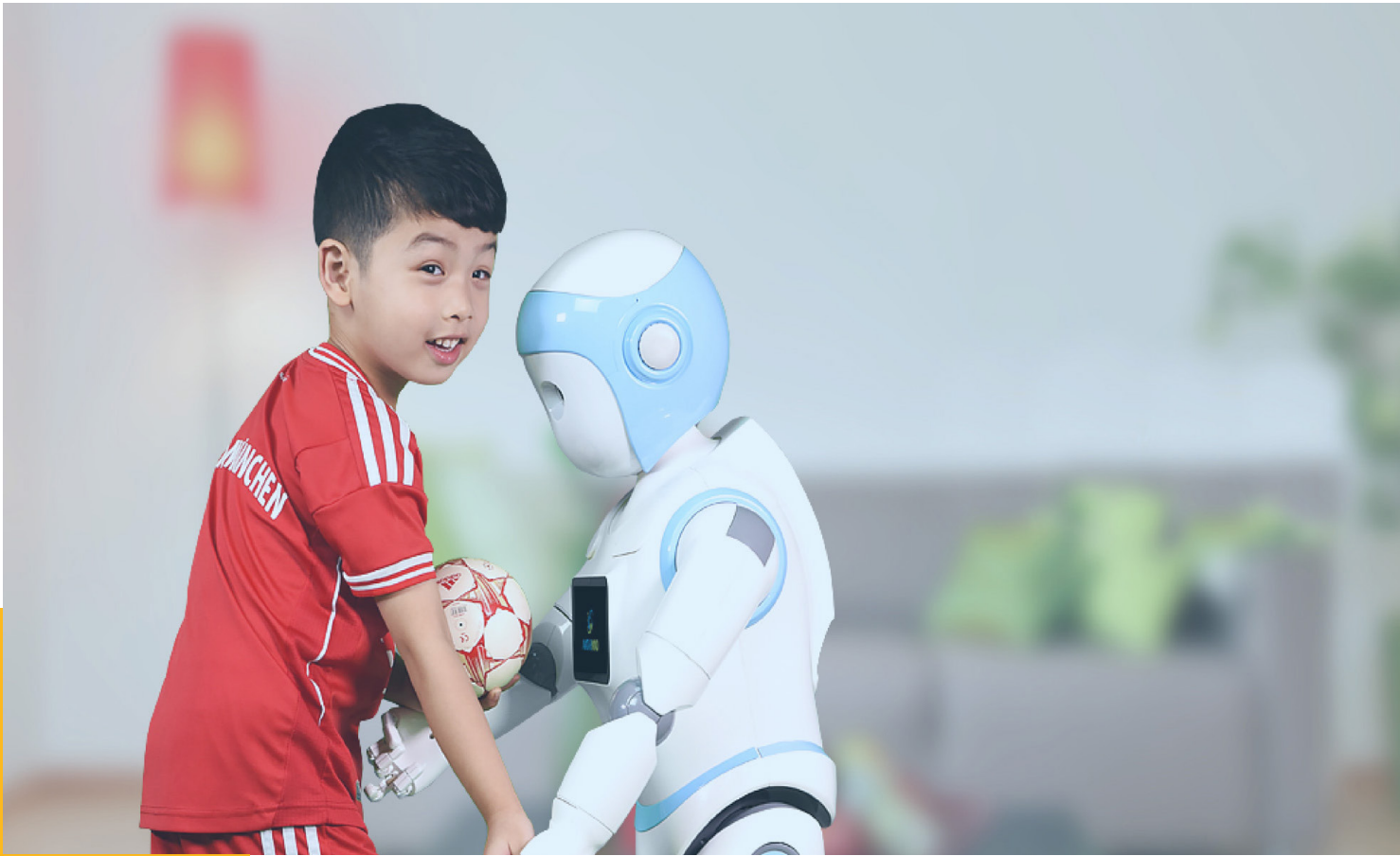
Language skills: Children between 2 and 4 years are still learning how to express themselves effectively with spoken and written words. An educational robot that helps them to build a wider vocabulary, make better sentences, and even write better letters and words is absolutely great for these kids.

Numerical and math skills: If you miss the basics, mathematical concepts can be very difficult to grasp or apply. An excellent educational robot can help children understand the basics of math and computation. Robots that encourage children to recognize and count numbers understand amounts and quantities are great for 3 and 4-year-olds.

Safety tips for buying toys for 2 to 4-year-olds

Learning with robots is great for kids but obviously they should not get hurt in the process so to make sure of that, an educational robot for children between 2 and 4 years needs to have the following safety features.

1. Battery-operated toys are safer as they reduce the risk of any accidental electric shock.
2. A sturdy toy is always better than a poorly made one, which is very important as children are involved. Make sure the toy is made from shatterproof materials and it's strong enough to withstand falls, so it doesn't fall and break into pieces with sharp edges.
3. Beware of toys containing button batteries or magnets because children can mistakenly swallow these parts. If the toy uses non-rechargeable batteries then it should have a secure battery casing which is screwed shut.
4. Make sure the toys you buy are suitable for the child's specific age group and abilities because toys for older children are not safe for younger ones.
5. Toys with small parts that can easily come apart are not safe for small children.
6. Don't buy toys that are made with toxic materials, lead paints, have exposed wires, or hinged parts that can pinch a child's fingers or trap their hair.
7. Do not let children play with broken toys; they should be fixed as soon as possible or thrown away.
8. Store toys safely to avoid accidents; if they are kept in the open in a high place, for example, a child could be tempted to try and climb up to get them.



YOUNG CHILDREN

Key skills being developed by young children (5 to 8 years)

Writing skills: Writing is a high-level skill requiring excellent hand and eye coordination. A child cannot learn to write until he or she has developed the necessary fine motor skills and an understanding of letters and numbers. Writing is a skill that builds on a child's previous knowledge of individual letters that make up words. At age 6, a child should be able to write legibly and with relative ease. Before their eighth birthday, children can usually write short notes and short stories with imaginary characters.

Reading skills: As they learn to write, children also learn to read. By ages 6-7 most children can read short storybooks and can comfortably pronounce up to 100 words correctly. They can also understand these stories, remember and talk about the characters and events in stories they read. By around 8 years old, most begin to read more fluently and you can find them reading on their own.

Basic math and computation skills: Just like reading and writing, math also requires a wide range of skills and a broad vocabulary. Children first learn to recognize and count numbers by age 3 and 4; by around 6 they should be able to do simple addition, subtraction, multiplication, and division, plus identify basic shapes like circle, square, and triangle. By second grade, kids can differentiate between different currency notes and denominations and they can also recognize whole numbers and decimals.



Talking and communicating: Children between 5 to 8 years can express themselves both verbally and in written form, such as short messages. They can talk fluently and communicate their feelings and thoughts. They can also fully understand what they hear and carry out conversations with other children and adults.

Creative thinking: Creative thinking is a skill that needs to be developed and at this age, children can usually come up with ways to accomplish small tasks, decide what they want to do and how to do it. They can get creative by drawing with colorful crayons and papers and solving simple word or math puzzles.

Teamwork and cooperation: By around 6 years old, children become more comfortable navigating through friendships and cooperating with others to work as teams and get things done. Gradually they become better at handling their emotions, showing empathy and consoling others.

Conflict resolution: With social interaction amongst children comes friction and conflict; handling the emotions needed to deal with these will still be really new and often confusing. But they'll gradually begin to understand how their words and actions can upset their friends and classmates and how to respond in such situations.

Key skills traits that toys for 5-8-year-olds should have

Solving puzzles: Robot toys for this age group should provide enough puzzles to keep children mentally busy. Solving puzzles helps children to learn through engaging their thinking and imagination.

Communication skills: Working with robots, especially when it involves some reasoning and teamwork, children will have to communicate their thoughts and ideas. As they do this, they indirectly practice how to better express themselves.

Math and computational skills: Mathematics is very important but children are rarely engaged by solving math problems in books. However, if a robot is involved then math problems become more exciting and engaging. Children learn much faster if that learning is interesting and fun – STEM robots are great for providing them with the stimulation and interest they need.

Basic coding and programming skills: Abstract concepts of programming will usually bore children but if you present the same subject in an exciting way you'll see them transform and become more enthusiastic. Basic programming and coding skills are essential in robot toys for kids.

Creativity: Playing with bots and completing simple tasks helps children put their creativity to use by focusing, thoughtfully analyzing and creatively solving problems.

Teamwork and collaboration: Robots that require children to work in groups encourages teamwork and collaboration and this is an essential skill that will come in handy in their adult lives.

Basic science concepts: Children need to grasp basic science and engineering concepts and an excellent STEM robot will make this both fun and interesting. With this, building a solid STEM foundation becomes easier.

Safety tips for buying toys for 5-8-year-olds

While buying toys for your young children, it is important to keep the following in mind.

1. Battery toys, if the batteries are in a secure case, are safer than electrical toys that need to be plugged into a socket.
2. Never leave kids alone to play with robot toys without an adult to supervise.
3. You should only buy toys that suit a child's age, abilities, skills and interest level. Toys that are too advanced can be unsafe and dangerous for younger children.





TWEENS

Key skills being developed by tweens (9 to 12 years)

Advanced reading and writing skills: at 9, kids are able to read virtually anything and will have an impressive and sophisticated vocabulary. They can freely express themselves in both verbal and written form, with increasingly correct grammar and punctuation. By now they have developed handwriting and writing will be more automatic. You can expect a 9-year-old to read different types of books, both fiction and non-fiction, and they'll read both for fun and to learn.

Advanced numerical and math skills: Kids in this age group can solve more complex math problems, work with fractions, decimals, and percentages. They can also solve simple problems in algebra and geometry.

Teamwork and collaboration: Kids this age are still learning to work as a team and solve problems together. Solving a problem that will require every member of the team to make some contribution will help them to be more responsible and forthcoming with their ideas, building the success of their team together.

Critical thinking: Tweens can think critically and abstractly to come up with impressive ways of dealing with complex problems. They can analyze situations and consider the outcomes and consequences of different courses of action.

Deductive reasoning: As kids become adolescents, they become more sophisticated in their thinking. They learn complex reasoning, like inductive and deductive reasoning, and will know that this information can be interpreted in different ways.



Problem-solving skills: With the right exposure and training, kids learn to solve problems and with continuous practice, they can become very efficient problem solvers. This helps them to tackle real-life problems on their own and confidently handle problems that life throws at them.

Time management: Tweens start learning to be independent; they can set the alarm and wake up to prepare for school, they can prepare a daily or weekly schedule for homework, house chores, piano practice and hanging out with friends. At this age, they become more responsible and start learning to manage their time and lives.

Conflict resolution: Resolving conflict can be challenging for adults but it's, even more, overwhelming for kids and it's easy for them to get frustrated with friends and classmates. Having to understand others and see things from their perspective can be difficult for tweens but it's something they can learn. When they learn to skillfully resolve conflicts by themselves, they will feel more mature and independent.

Key skill traits that toys for tweens should have

Computer science skills: Many robots help kids learn very important computer skills such as coding and programming. Some even let kids write their own codes and see it run while others will help them to build a robot.

Critical thinking: An excellent educational robot should be able to encourage kids to do some serious thinking before they can complete a task.

Patience and persistence: This is one thing anyone needs to excel, and kids need to understand this. With robots, they can learn to be persistent when tackling a difficult challenge, even if it will take hours of calculating and thinking creatively. Not giving up when faced with a problem is a useful character trait.

Problem-solving skills: Robots should help kids develop and practice their problem-solving skills by continually providing them with challenges and problems to tackle.

Basic science: The basis of science is understanding cause and effect; a good robot should make kids use their imagination to come up with ideas and to prove them practically.

Tips for tweens to stay safe with robot toys

It's important that kids stay safe even while learning and here are some safety tips.

1. Make sure tweens always put robot toys away safely after playing so younger siblings won't get to it and maybe get hurt.
2. If you come across any unsafe or malfunctioning robot toys, especially if they could cause injuries, send a complaint to the Consumer Product Safety Commission (or the equivalent organization in your own country).
3. Broken toys should be fixed as soon as possible or thrown away.





TEENAGERS

Key skills being developed by teens (13 to 17 years)

Logical thinking: Teens will continue to refine and develop their thinking skills as they move into adulthood.

Problem-solving skills: Lots of practice is still needed to fine-tune their problem-solving skills. This will help them become more independent, make their own decisions and achieve challenging goals.

Time management skills: Teens also need help in perfecting their time management skills, another essential skill necessary for when they move into employment.

Organizational skills: This is the age when they learn more about how to plan and put things together, such as organizing an event like a birthday or Christmas party.

Key skill traits that robot toys for teens should have

Logical reasoning: Robots toys do a better job if they can encourage teens to put their reasoning to work and demonstrate some impressive thinking.

Advanced coding and programming: As kids grow older they start to write some advanced coding and work on serious programming. Good robotic programs can help them to do this.

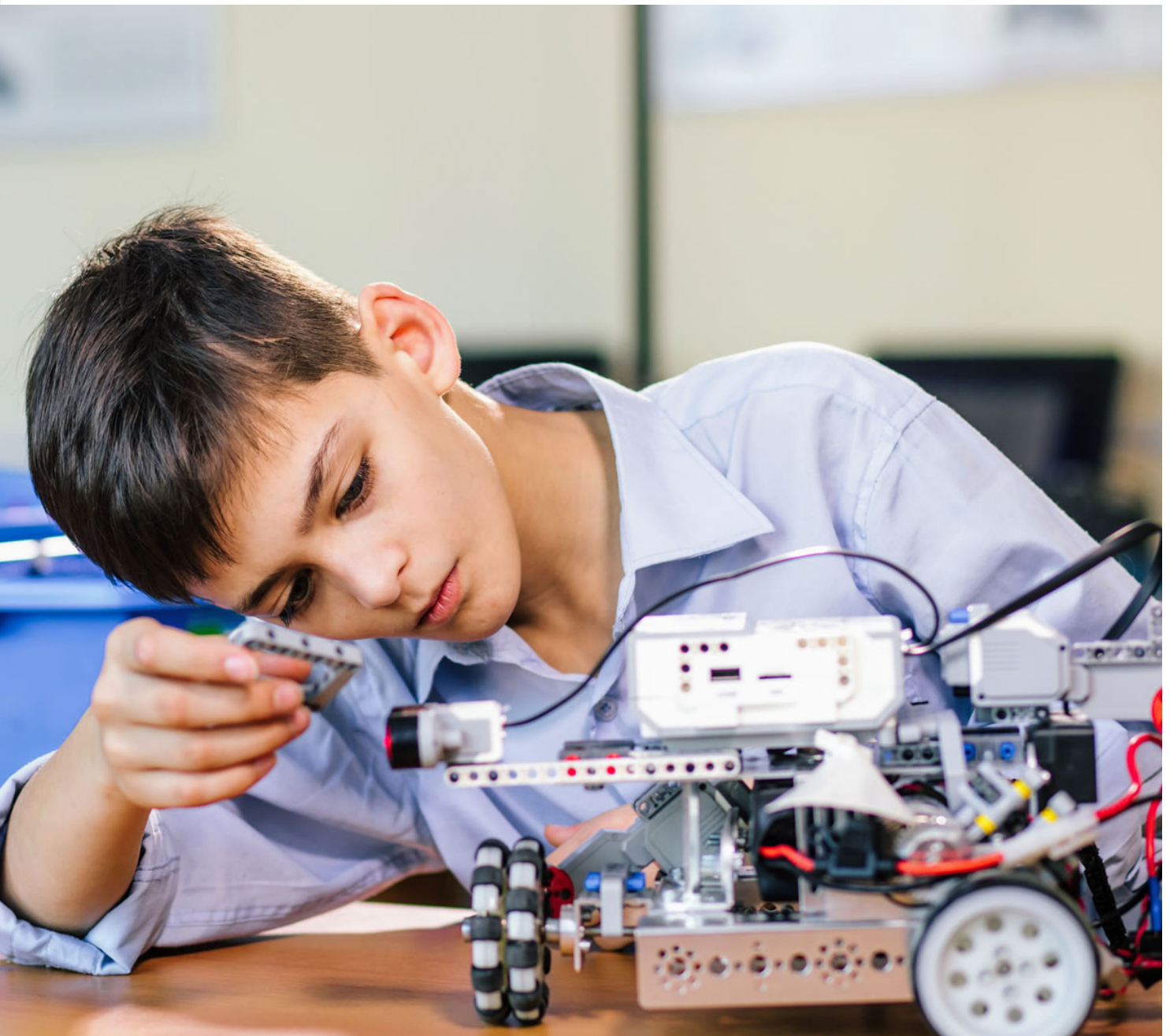


Great robots help kids develop a genuine love and interest in life's necessary science, technology, engineering and mathematics skills.

Tips for teens to stay safe with robot toys

Even teens need to stay safe with their toys, here are some safety tips.

1. They should always put away toys after use for the safety of their younger siblings.
2. If you come across any unsafe or malfunctioning robot toys, especially if they could cause injuries, send a complaint to the Consumer Product Safety Commission (or the equivalent organization in your own country).
3. Broken toys be put away safely until they're fixed or thrown out.



FINAL THOUGHTS

STEM education can actually start even before a child's first birthday and you don't have to wait until he/she starts taking math and science classes. A child's ability to make inferences and draw conclusions about cause and effect is the basis for building solid lifelong STEM thinking skills.

According to research, a child's early experiences build 'brain architecture' and lay the foundation for lifelong thinking skills and approach to learning which are both essential for a successful STEM career path as an adult. Robot toys, suitable for their learning and development age, are a great way to stimulate a child's interest for STEM studies.

