

*Australian Teacher*

# **Inventors & Inventions**

*Suitable age group:  
10 and older*



# What is an Invention?

An invention is a new idea, sometimes a new way of solving a problem.

Many inventions have little or nothing to do with science. Games, for example, are inventions.

When we think about the great inventions of the world, we find that they are either very simple, basic things like the wheel or very complex things like the computer.

No one knows who made many of the earliest inventions – like clothes, the lever, the wheel, how to make and keep fire, to name just a few.

There are two types of inventions that are important. The first is a *breakthrough* invention; examples are the telephone, fireworks, the laser, and the helicopter. The second type of important invention is an *improvement* such as making something more safe, making it cheaper, or making it faster.

Many of today's inventions are different in essence from inventions of, say, a hundred years ago. In recent times there has been a rapid movement away from mechanical creations into the era of electronics and digital technology.

Not so long ago it was possible to see exactly what a new machine did. Today's inventions, though, are very often 'hidden' in silicon and software, with only a fast-moving display on a screen as any evidence that something very clever has been achieved.

The differences between our (human) way of life and that of other creatures have come about largely through our inventiveness.

## **Talk about or Write about**

*(Justify your responses with explanations and examples wherever possible).*

1. Name three inventions for which the inventors would have required a knowledge of science and three for which no knowledge of science would have been required.
2. Can you think of any large inventions that are not games and do not require their makers to have any knowledge of science?
3. Can you think of one breakthrough invention, not mentioned above, and one invention that was an improvement on something else?
4. What is an example of a recent invention that can't be seen?
5. Give some examples of inventions that have made our way of life different from the way other creatures live their lives.

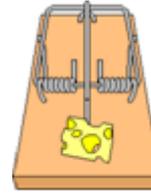
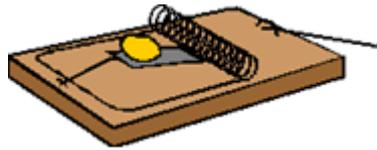


# Ideas and Methods

If you want to invent, look at what is wrong with things you use now.

It is often said that every inventor dreams of making a better mousetrap.

The US Patent Office alone has more than 4 000 mouse-catching devices on file and patent offices around the world continue to report the improved mousetrap as the most commonly registered entry.



Many inventors lack the skills they need to let people know what they have created and why their invention is better than previous inventions.

You may be able to invent without understanding reading, writing, maths, history and science. However you are not likely to profit from inventing without sound skills in most of these areas.

You need to be able to read well to learn new skills. A good idea is useless if you do not have the writing skills to be able to tell other people how and why your invention is valuable. You often need maths to figure out how to make your invention and you always need maths to figure out the cost to make and sell the invention. You almost always need science to make the invention at the lowest cost; it is important to be able to make the invention at a price that people can afford.

Before creating something you should meet with different people. Talk with them about how they would use your invention. What do they like about it? What don't they like about it? This will help you decide if your invention is worth pursuing or not.

**Talk about or Write about** *(justify your responses with explanations and examples wherever possible)*

1. Why might mousetraps be such a popular invention?
2. Apart from the mousetrap, can you think of another simple invention that inventors try to continually improve?
3. If you were interested in inventing a machine that could clear city streets of litter more effectively than current methods say which people you would need to speak with about your proposed invention. Include those whose permission you may need as well as those whose opinions you would seek regarding the positive and negative attributes of your device.
4. What could an inventor do if he/she was not skilled in marketing their invention?
5. If someone is planning on inventing a new type of golf club whose advice should they seek prior to redesigning the current model?



# Patents

If someone has a good idea or invention, they may not want others to copy it. They need a patent so no one can copy their idea and make money from it.

To stop someone from copying their invention, inventors apply for a patent from the government. The government gives them a patent if their invention is new and useful.

When a patent is granted no one can copy that object, pattern or design.

Anyone can apply for a patent, as long as the idea is new.

A patent cannot be written material; books are protected by copyright not patents.

The life of a patent depends on what kind it is, but it is usually at least ten years.

A lawyer can help an inventor find out if anything about their invention is already protected by another patent and can also assist by helping them to fill out the right papers for a patent.

If an inventor has an idea for a new or improved product, he/she needs to know:

- (1) Is there a patent?
- (2) Can all or just part of it be claimed as new?
- (3) Which parts are new?

**Talk about or Write about** *(justify your responses with explanations and examples wherever possible)*

1. What could happen if there were no such things as patents?
2. How likely do you think it is that two people might apply for a patent for exactly the same invention?
3. Why would someone want to copy another person's invention?
4. Why might governments welcome new inventions from their people?
5. What might be something that an inventor might wish to improve only a part of?



# Looking for a Better Way

You don't have to be a genius to be an inventor; it just takes thought and creativity.

Every invention starts out as an idea and, because everybody has ideas, anyone can be an inventor.

Inventors set out to create new products and this often occurs in their field of work.

The first requirement is to spot a need that can be met in an innovative way; the ability to come up with a new idea follows.

An inventor's greatest asset is to be able to look at a problem with 'new eyes' and to see past the usual way of doing things.

Inventive people are always searching for a better way.

**Talk about or Write about** *(justify your responses with explanations and examples wherever possible)*

1. Which do you think is the best 'gift', intelligence or creativity?
2. Why do inventors try to look at problems with 'new eyes'?
3. An inventor might come up with the idea that it would be better if aeroplanes take off and land vertically, like helicopters do. Would this person require a thorough knowledge of science? If so, what branch of science?
4. If someone wanted to think up an idea for a new invention that would help reduce pollution in our rivers, would they need a lot of intelligence, a lot of creativity, a lot of compassion for the environment or all three?
5. Can you think of a good idea for a new invention?



# Time Savers

Our ancestors were forced to light their houses with candles. We still use candles but these, instead of being made by hand using the old and very slow process of dipping, are moulded, and one machine, which a child can attend to, makes seven thousand candles in an eight-hour day.

The time saved by machinery in the making of matches is even more startling than that saved in the manufacture of candles; the match-cutting machine cuts 6 375 matches in the same space of time that a person could shape three matches by hand.

Almost every article in common use was once handmade; and while handmade goods were, and are, strong and durable, they took so long a time to make that they were expensive. Take, for instance, a pair of boots. To make even the cheapest and commonest pair of men's boots took fifteen and a half hours of steady work. The invention of boot-making machinery enabled a person to make ten pairs of boots in the time previously taken to make one, with the result that boots can now be sold for less money.

In coalmines, a miner formerly spent a hundred and seventy hours to produce fifty tonnes of coal by hand, whereas the same work can be done by one man with the aid of machinery in one third of the time.

## **Talk about or Write about**

*Justify your responses with explanations and examples wherever possible.*

1. Machinery has made the manufacture of many products much easier and quicker. Do you think anyone has *suffered* as a result of the increasing use of machines?
2. New kinds of jobs were created when machines began to be used to produce goods. What do you think these were?
3. Which would give the truer cut, a match-cutting machine or a person shaping matches by hand? Explain your answer.
4. Why are goods that take a long time to make expensive?
5. Clearly, there are many ways in which machines have advantages over humans. Can you think of any *disadvantages* of machines?



# Machines v People

Biscuits are made by machinery. If you visit a biscuit factory you will see all the ingredients being mixed by machines; they are never once touched by the human hand. The way in which they are baked is very interesting. The biscuits, lying on a sort of endless band made of wire gauze, go into a very long oven, pass slowly through it without stopping, and come out at the other end, perfectly baked.

Nearly all our food, especially the tinned and bottled goods that form so large a part of it, is prepared by machinery. All our drinks are bottled by automatic machines. There is a very cleverly made machine that seizes empty bottles, clutches each by the neck, and fills them at the rate of twenty-four thousand a day. Another machine corks bottles at the rate of three thousand an hour. Consider what an army of people it would take to do such work by hand labour!

In the old days all washing of clothes had to be done by hand, and the laundresses had to work very hard for very little money. But visit a modern steam laundry, and you will see machinery that will wash and finish collars and cuffs at the rate of two thousand an hour; that will wash two hundred shirts in the same time, and gloss and iron them at the rate of one every minute. There are even machines for marking linen, one of which does the work of six people.

## **Talk about or Write about**

*Justify your responses with explanations and examples wherever possible.*

1. Imagine you are living in times before modern machinery was used. You are a worker in either a biscuit factory, a soft drink factory or a laundry.

- Describe your work.
- Describe your working environment.
- What could go wrong at work?
- How would you feel at the end of the day?
- What kind of pay might you receive (dollars per hour)?
- What is the best thing about your job?
- What is the worst thing about your job?

*Continued next page*

## *Inventors & Inventions*

2. Now you are living in the present. You are a worker in either a biscuit factory, a soft drink factory or a laundry.

- Describe your work.
- Describe your working environment.
- What could go wrong at work?
- How would you feel at the end of the day?
- What kind of pay might you receive (dollars per hour)?
- What is the best thing about your job?
- What is the worst thing about your job?

3. Now compare the 'old' factory with the modern-day factory.

- Which is cleaner, has less dust etc?
- Which has the better light?
- Which has the better air-conditioning/heating?
- Which is noisier?
- Which is safer?

4. Research: Type key words into a search engine to see what you can discover about the processes and machinery involved in bottling. Can you discover who invented the machine that inserts corks into bottles?

5. Research: Try to find out who invented the washing machine.



# Faster and Better

A hundred years ago all nails used by carpenters were handmade, and whole towns were engaged in nail making—men, women, and children. It was not only cruelly hard work, but was one of the worst paid of all jobs, and nail makers always lived on the edge of starvation. Then inventors set their brains to work, with the result that we now have a machine which makes nails at the rate of a thousand a minute. The cruel old trade of nail making by hand is now gone, and nails are cheaper and better than they ever used to be.

Bricks are still moulded by hand in some small, out-of-the-way places, but the handmade brick cannot compete with the machine-made. The machine will mould thirty thousand bricks in ten hours, whereas the most skilled workman could not make even a tenth of that number in the same time.

A machine for folding, wrapping, and addressing magazines was invented by George Richards, an American publisher. This machine occupies a small room, yet does the work of a hundred people. Piles of newly printed magazines are fed in on one side of the machine, and a moment later come out upon the far side rolled, wrapped and addressed, rushing along a conveyor belt and falling gently into their appointed sacks. The machine handles the magazines at the rate of several thousand an hour. Equally ingenious is a smaller piece of mechanism, about the size of a typewriter, which 'licks' stamps and puts them on the packets at the rate of eight thousand an hour, and, while so doing, counts every stamp used.

**Talk about or Write about**     *Justify your responses with explanations and examples wherever possible.*

1. What would be one of the hazards of making nails by hand?
2. Why do you think it is that machine-made nails are better than hand-made nails?
3. What would be one of the hazards of making bricks by hand?
4. Some benefits of George Richards' machine are mentioned in the passage. Can you think of any benefits that are *not* mentioned?
5. Who could have been disadvantaged by the introduction of the two machines referred to in the third paragraph?



# **World's Youngest Inventor**

The youngest known inventor is Jacob Dunnack of the USA. As a six year old, Jacob invented a toy plastic baseball bat, the Batball. With a unique design, the top of the bat opens and closes securely so that baseballs may be stored inside it at the conclusion of the game. Jacob's Batball is 55cm long and it has an oversized barrel. It comes with three balls, which are coloured yellow to make it easier to keep your eye on them. The Batball is designed for ages three and up.

Chelsea Lanmon of the USA may be the youngest female inventor. At the age of nine she invented a plastic baby's nappy (or diaper) that has a peel-away pocket. The pocket contains a disposable baby wipe and baby powder puff.

When Akhil Rastogi's mother suffered nerve damage in one hand, seven year old Akhil had to pour the milk at the family dinner table. It was difficult for the small boy not to spill the milk and he used two hands as he tried to lift the jug higher and higher. This became very frustrating for Akhil. "There has to be an easier way," he thought. Akhil got a wad of clay and in about three hours fashioned a screw-on spout with a channel running down the middle. No more spills. He entered his milk spout at a school fair and won first place. The judges suggested he patent his invention. At age 11, he became one of the youngest people ever granted a patent. Akhil, who now has a line of products (including a tape dispenser and a device to help teach blind students) hoped to market his plastic spout to elderly and disabled people, although he believed "even regular adults" would buy it. He thought his milk spout should sell for about 50 cents and he planned to use any profits to help pay his college tuition.

## **Talk about or Write about**

*Justify your responses with explanations and examples wherever possible.*

1. Why could it be that the Batball, or something bigger but similar, may not be suitable for adult baseballers?
2. Who do you think has benefited most from Chelsea Lanmon's invention?
3. From the story about Akhil what would you say are some of the qualities he possesses?
4. Some of Akhil's inventions might bring him more than just monetary rewards. Why might this be?
5. In considering Jacob's Batball, Chelsea's nappy and Akhil's milk spout, which of the three young inventors would you say showed the most creativity?

