



**Wheel Well**

FOR CHILDREN IN ROAD SAFETY

# Car Seat Groups and why the are important



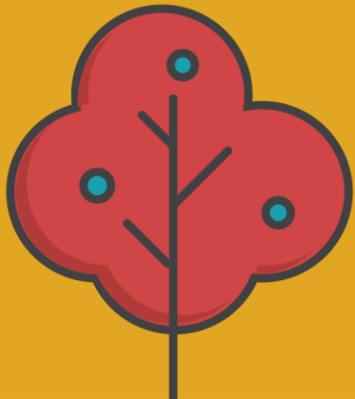
# Car Seats and why they are important:

Car Seats must keep your child safe during a crash.

What we deal with in a collision is called **crash dynamics**. This is all the forces that play out during a crash and it is devastating.

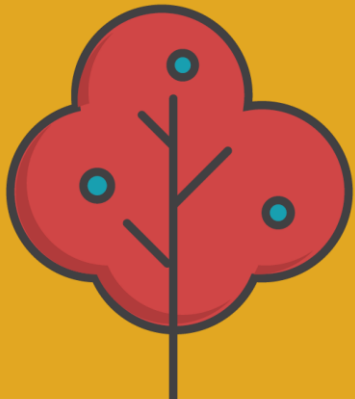
Within the vehicle we deal with the following:

- Crash force
- Momentum
- 3 Collisions in 1



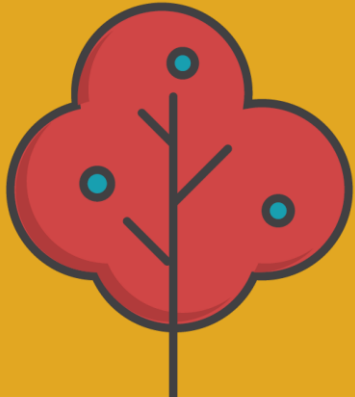
**Crash force:** This is velocity x mass and in basic terms it boils down to weight x speed.

Take your child's weight, multiply it with the speed you drive and that is the force that your child will hit the next object in a crash.



**Momentum:** Newton's First Law of Motion simply states that any moving object will keep moving at the same speed and direction until some force causes the object to change its motion.

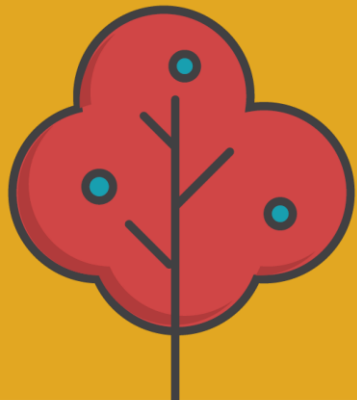
When you first get in a car, a force is required to change your motion. As you accelerate the car, you feel the back of the seat pushing you forward. As soon as you reach a constant speed, though, you no longer feel the seat pushing you from behind. Your body will continue to move in the same speed and direction until a force causes the motion to change.



### 3 Collisions in 1:

Motor vehicle crashes involve three collisions and a thorough understanding of these allows occupants to lessen their risk of death or injury in the event of a crash by wearing seat belts.

- Vehicle collision
- Human collision with interior and each other
- Internal collision (organs against cavity walls)






# Our vulnerable children

At birth, our little babies are very vulnerable and they need us to protect them and keep them safe. Their skeletons are immature and not yet developed as that of an adult.

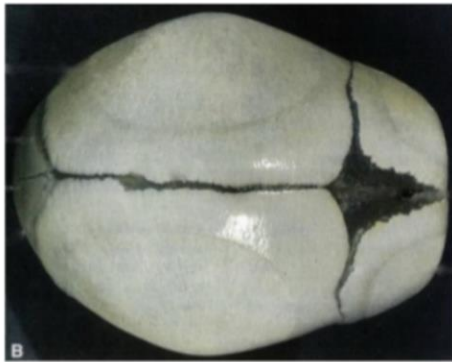




We all know about baby's fontanelles. The posterior fontanelle, at the back of the head, is usually smaller and closes up by about 4 months of age. The anterior fontanelle is usually bigger, starts getting smaller around 6 months, and doesn't close up until 9-18 months of age (by 2 years at the latest).

Until the age of two, our infants are vulnerable to head injuries and we have to protect that little head and the brain inside as best we can. We must give the skull plates the necessary time to fuse together and provide the required protection for the brain.

TERM FETAL SKULL



ADULT SKULL



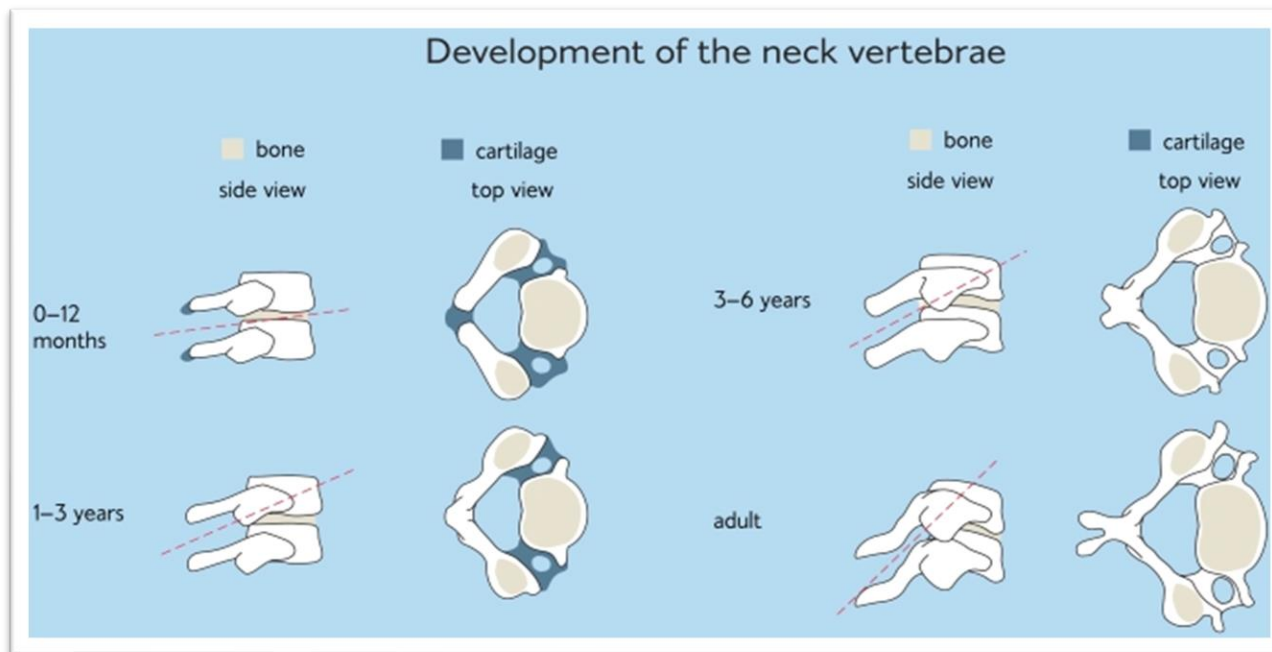


At birth, your baby's head is about 25% of its body weight and this only normalises in adulthood. Infants are thus top heavy and new-borns cannot even keep their own heads up by themselves. The result is that during a frontal crash, a baby's head will throw forward with more relative force than that of an adult. This can cause severe head and neck injuries.





A baby's vertebrae also differ to that of an adult. At birth, it consists of cartilage and bone and only ossifies, hardens, after 3 years of age. This makes the young neck and spine very vulnerable to injury. The vertebrae only mature in adolescence and till then needs protection.




The infant pelvic bones are still separate little pieces and must grow together like puzzle pieces. This growing together is completed during adolescence. The immature pelvic bones cannot take the strain of a 3 point seat belt and needs a 5 point harness like that of toddler seats to keep it safe. Young children also don't have a prominent hip bone required to keep the lap belt portion of a seat belt in place.

## HIP & PELVIS DEVELOPMENT



Number of Bones in the Hip & Pelvis



Combine these factors, and you have a very vulnerable child that requires safety over and above what an adult seat belt can provide. Car seats are also specifically designed in groups to keep up with the development of your child and provide them with the protection they require at each stage.

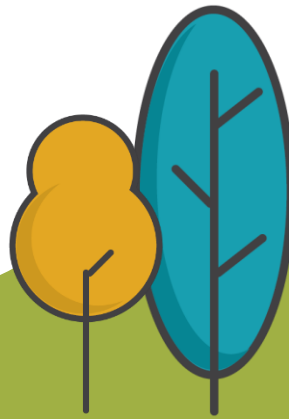
Car seats are designed to keep our children safe during a crash. It is vital that we keep this and their vulnerability in mind when we choose a car seat.





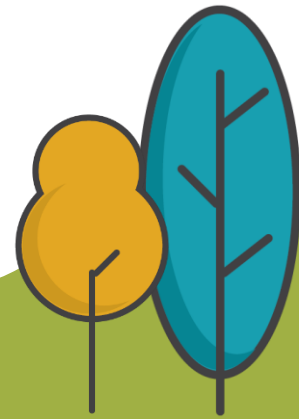
## Benefits of car seats

Evidence suggests a 71% reduction in deaths and a 67% reduction in injuries when child safety seats are used properly.





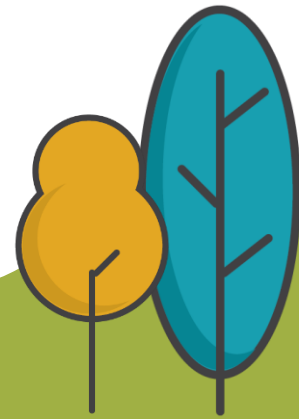
The rear seating position is safer for children newborn to 12 years of age, with a 35% reduction in death rates compared with front seating, and with a 46% reduction in death rates compared with front seating with an airbag.





The main reason of fatality for children in frontal impacts is that they are not correctly restrained: 32% of cases studied were unrestrained and 23% used an inappropriate and/or a misused restraint system. The estimated total number of children killed that are not correctly restrained in a frontal impact is 55%.

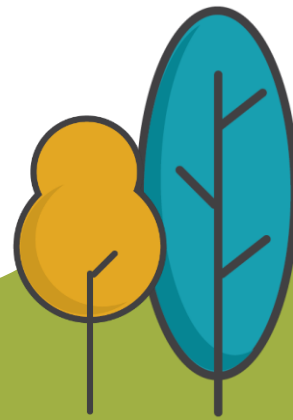
FARS data from 1989 to 1998, Glass et al. (2000)



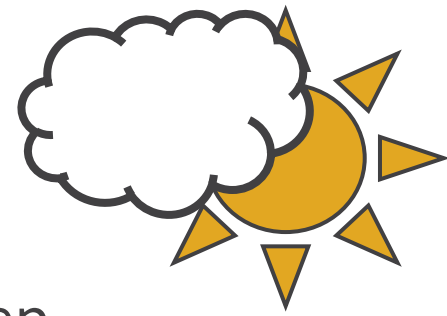


Passenger airbags were associated with an increase in child fatality risk of 31% for restrained children, and 84% for unrestrained children. Passenger airbags did appear to offer protection to restrained 9- to 12-year-old children.

FARS data from 1989 to 1998, Glass et al. (2000)



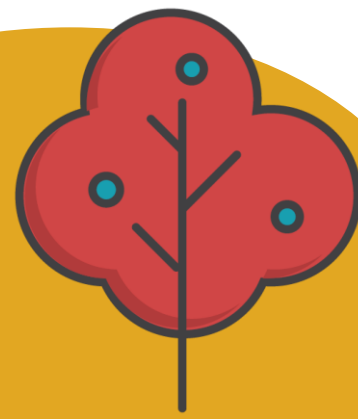
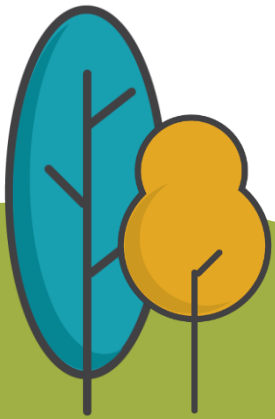




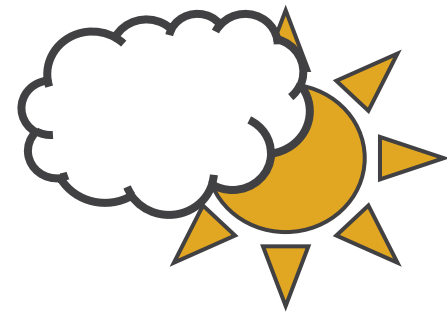
# Groups of Car Seats

Car seats are designed in 3 different groups to keep up with your growing child. Each group car seat is specifically designed to keep your child at a specific stage of development, safe.

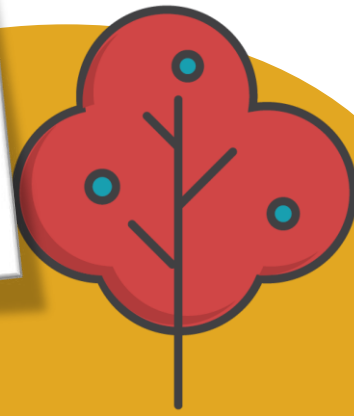
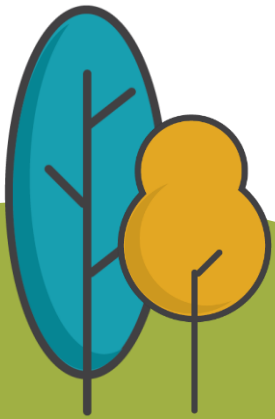
- Infant seat – new-born to 13kg or 15 months
- Toddler seat – 9 to 18kg or 4 years
- Booster seat – 15 to 25kg or 8 years
- Booster cushion – 22 to 36 kg or 1.5 m tall



# Infant Seats



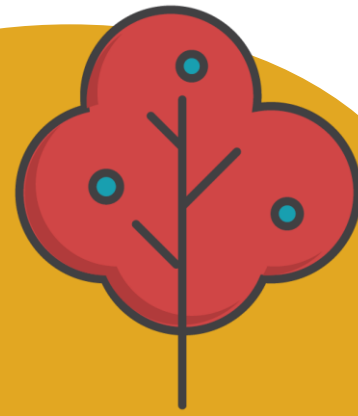
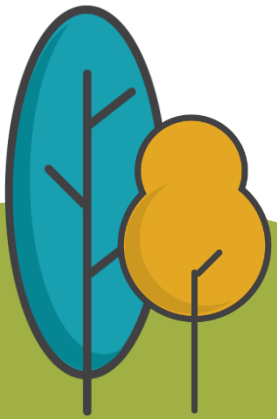
Infant seats are designed for children till 13kg, 15 months or 75cm. It is advised that you use a seat like this till your child outgrows them in either weight, height or age. Infant seats must be used till your child is at least 6 months old or can sit strong by themselves. Thereafter you can switch to a rear facing convertible seat.



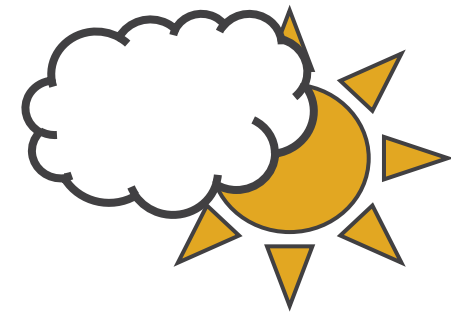
# Infant Seats



Baby seats have a flatter angle. This is to ensure that there is no strain on the neck or back of the child and to prevent the head from falling forward during travel. The optimal incline is 45 degrees.

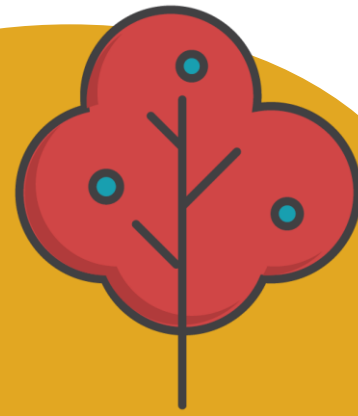
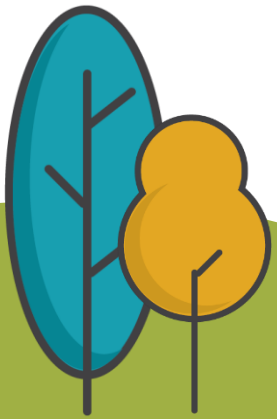
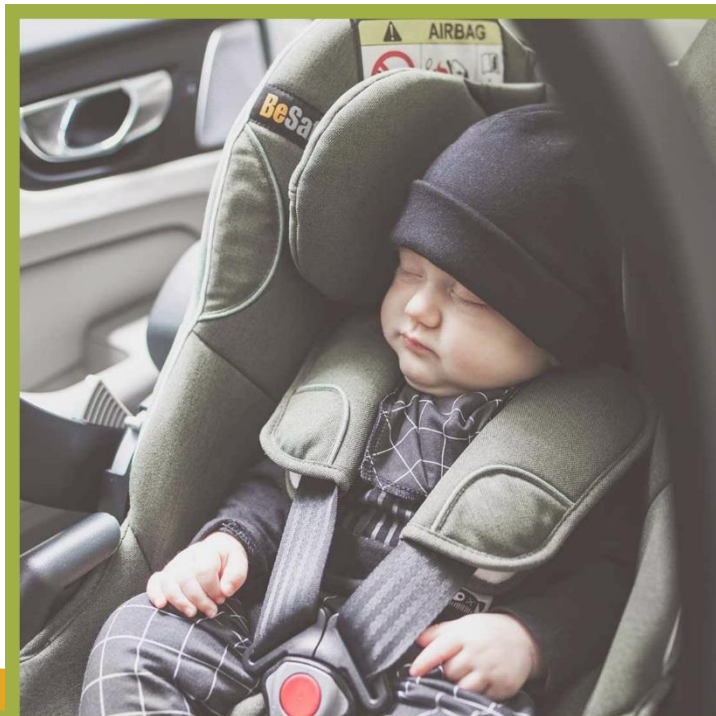


# Infant Seats



Baby seats are always installed rear facing.

Rear face for as long as possible.

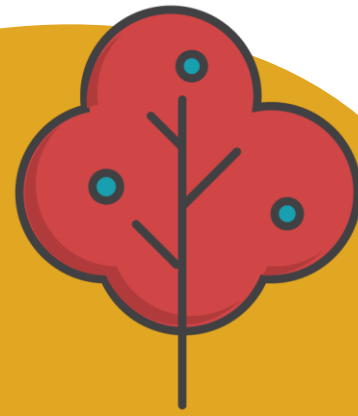
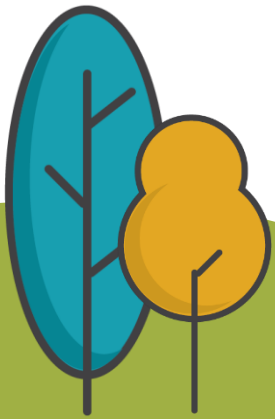


# Infant Seats



A safe baby seat will have side impact protection for the head and neck of your baby. The side impact protection does not only provide a softer surface that the head will touch against during a crash, but it minimises the movement of the head and will absorb crash forces.

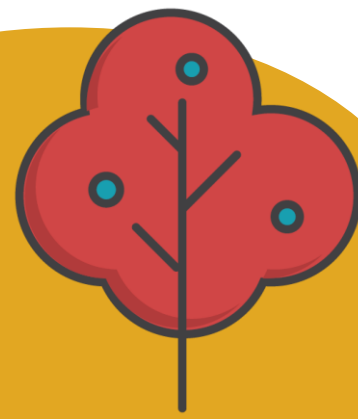
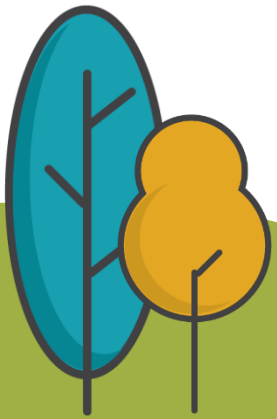
A good baby seat is quite deep and your baby will be within the safety zone of the seat. Imagine looking at the seat from the side with your baby in it: very little of your baby will be visible. Your baby is within a cocoon of safety.

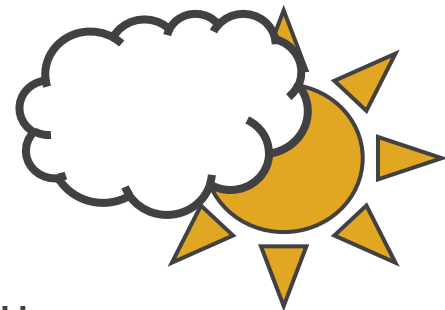


# Infant Seats



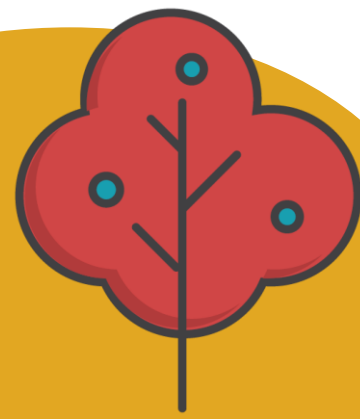
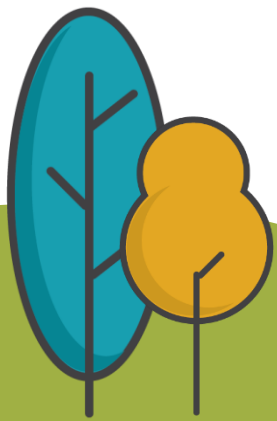
Baby seats will have blue markings to show the belt path for a seat belt installation.





# Infant Seats

Some baby seats have bases that make it easier for you to take the seat out of the vehicle and put in again. Car seat bases can be installed with seat belts or Isofix.

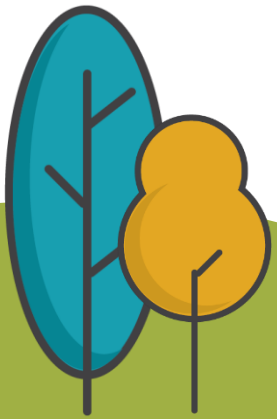




# Infant Seats



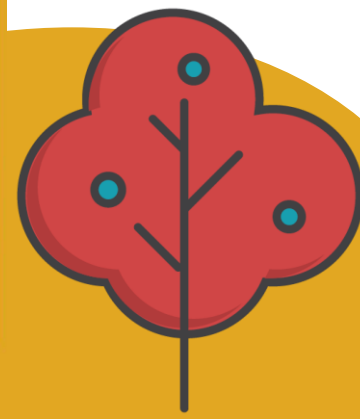
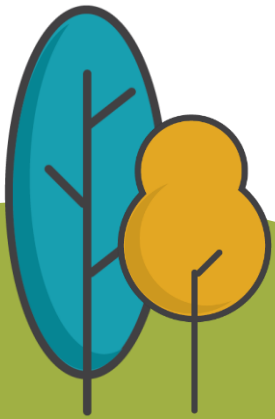
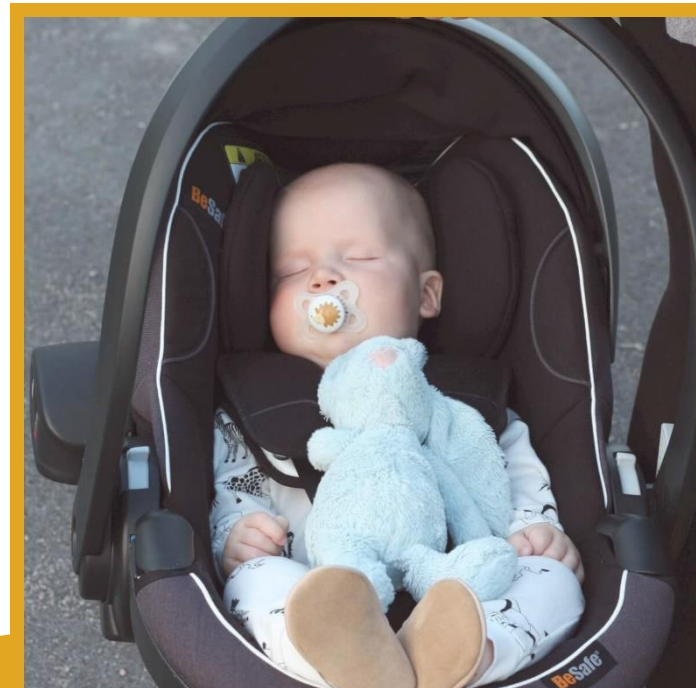
Baby seats are designed to be removed from the vehicle to allow you to carry a baby safely in their seat. This is very handy when your baby is sleeping! Baby seats double up as rockers and you can sling the handle back to turn it into a feeding seat.



# Infant Seats



**Words of caution:** Car seats are not beds. It is quite safe for baby to sleep in a car seat for short periods of time, but it is preferable that they sleep on a flat surface when they are at home. It is recommended that a new-born baby spend no more than 20 minutes in a car seat at a time. You can extend this period as they grow older and stronger.

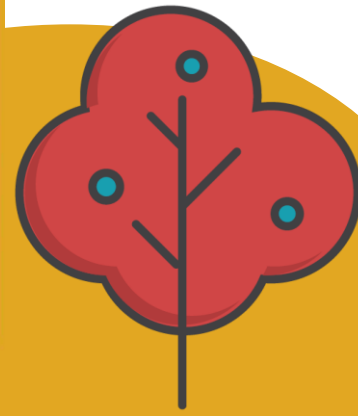
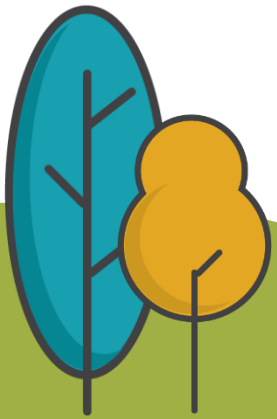
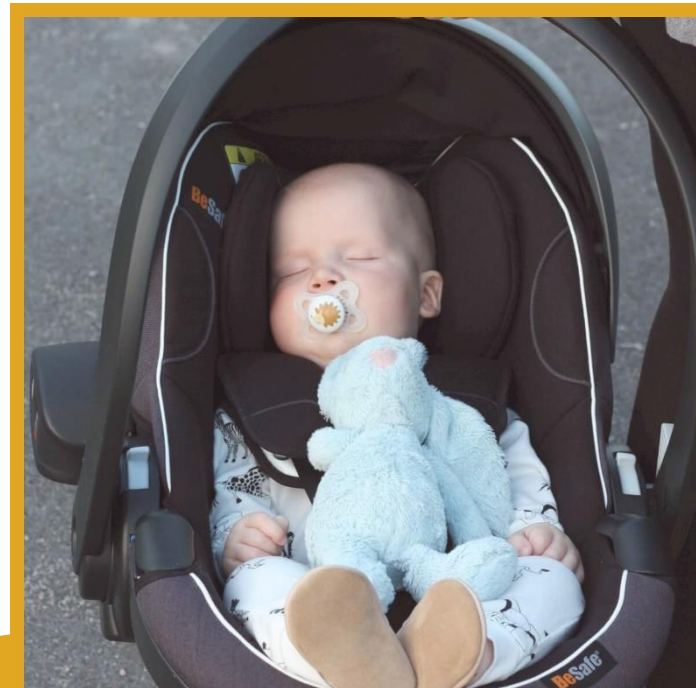


# Infant Seats



## More words of caution:

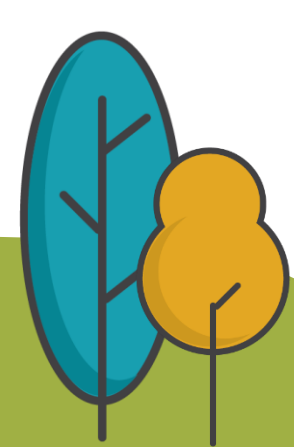
- Do not use any aftermarket products or bulky blankets under your baby in your baby seat.
- Don't make any alterations to your car seat.
- Never leave your child unattended in a car seat.



# Toddler Seats



Toddler seats are designed for children from 6 months, 9kg or 70cm tall. There is an overlap in the size and weight requirements for car seats. This is to accommodate the fact that kiddies do not come in a standard package. We have short chubby kids, tall skinny ones and every variation in-between. The upper limits for a toddler seat are 18kg, 105cm or 4 years old.



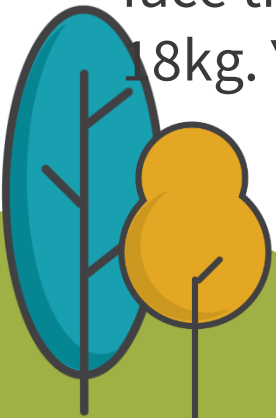
# Toddler Seats



Toddler seats can be convertible seats: in other words, you can install the seat in a rear facing and forward facing position.

You also get combination seats. This is where you have more than one group of seat combined in one.

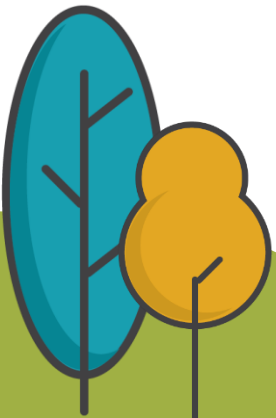
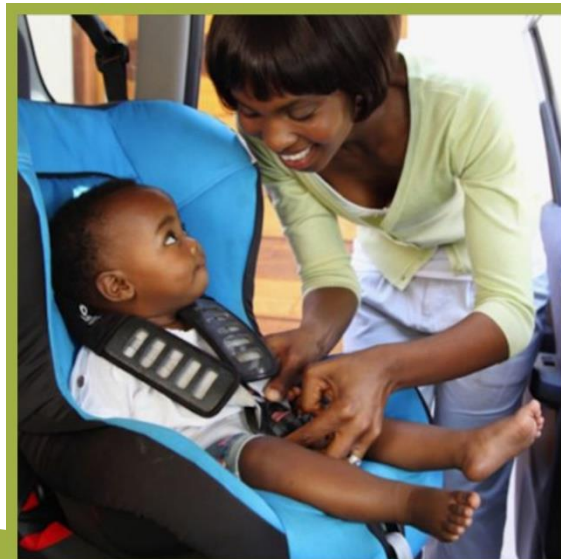
Make sure you read the manual carefully and understand the features of your combination and convertible seats so that you can use it to your child's best advantage. Toddler seats typically can either forward face from 9 till 18kg, rear face till 13 kg and then forward face till 18kg or rear face till 18kg. You now get seats that can harness till 25kg as well.



# Toddler Seats



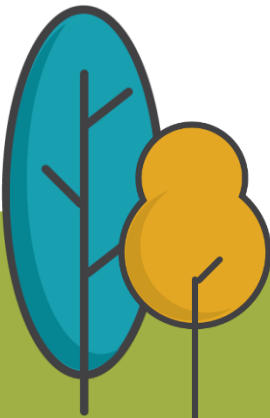
- Your child can now sit stronger and will enjoy the more upright position as they start to interact with their world.
- It is important to keep your child rear-facing till at least 15 months.
- Toddler seats must have a 5 point harness.
- Toddler seats recline for more comfort when sleeping and to support the back, especially when they are little.



# Toddler Seats



Red markers will indicate seat belt guides for a forward facing installation and blue will mark the guides for a seat belt installation rear facing. I remember it as blue is for babies and red is for rascals. Follow the instruction in your manual to the letter as the installation differs between different orientations.

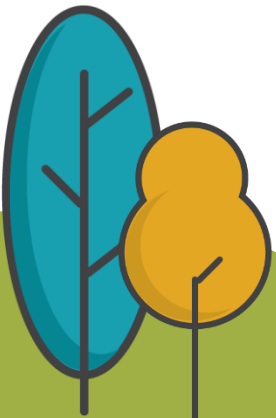




# Toddler Seats



- Toddler seats can be installed with Isofix as well. Make sure your vehicle is Isofix compliant before you purchase an Isofix seat. Remember to look for the back tether anchor point.
- Toddler seats remain installed in the vehicle.

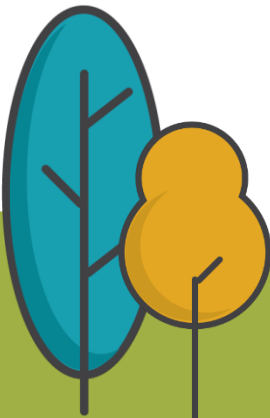


# Toddler Seats



## Words of warning:

Keep your child in a toddler seat till they are at least 4 years old, 105cm tall or 18kg in weight. Resist the temptation to move your child up to a booster seat too early. Lucky for the moms with big babies, there are now several seats that harness up to 25kg, 115cm or 6 years old.

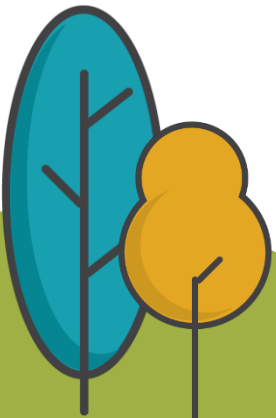


# Toddler Seats



## Words of warning:

- Check your car seat installation and harness fit regularly for firmness.
- Keep your car seat clean. Dust, crumbs and spills can get into the buckle and reclining mechanism of your seat. It will not perform optimally if it is dirty.



# Booster Seats

At 4 years of age, 95cm or at a minimum of 15kg, your child is ready to ride in the booster. They are now strong enough to do away with the 5 point harness and can use a seat belt.

The problem is that seat belts are designed to keep adults of 1.5m or taller safe - not children of 4.

Boosters cover groups 2 and 3.

The 15kg minimum weight is to accommodate our tall skinny kids and not our short chubby



# Booster Seats

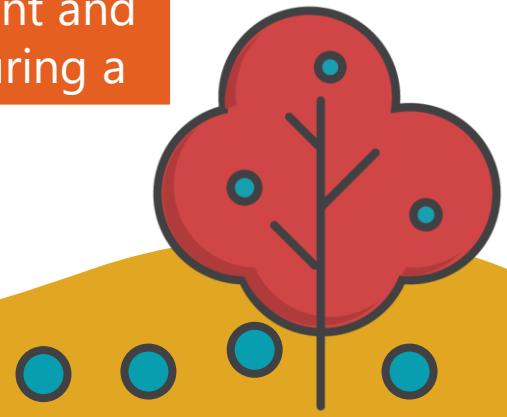
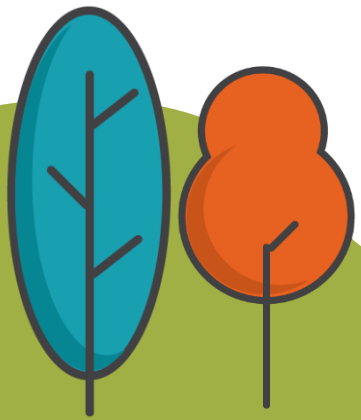
The booster seat is designed to make a seat belt fit your child.

Booster seats raise your child so that they can see out of the window and bring the seat belt down to their shoulder height.

The shoulder belt must pass over the middle of their shoulder, away from the neck and across the chest.

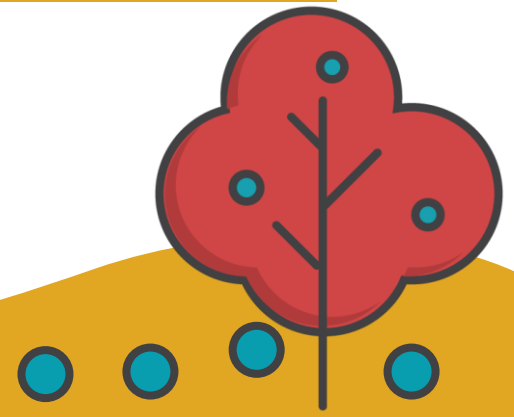
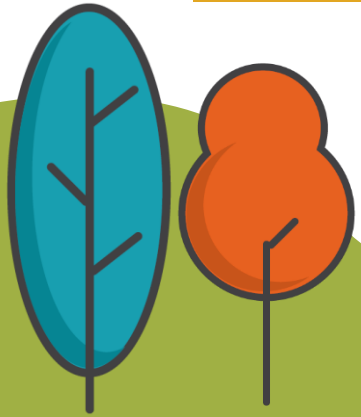
The lap belt must go over the lap and hips – never across the tummy.

Imagine the torso as a rectangle.  
The shoulder belt crosses the torso to divide it into 2 equal triangles. The upper body is balanced within the restraint and this will increase safety during a



# Booster Seats – Group 2 & 3

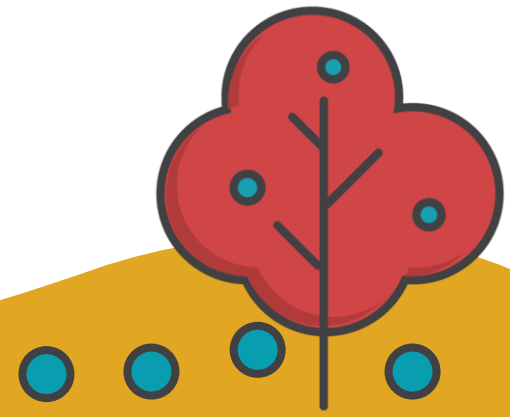
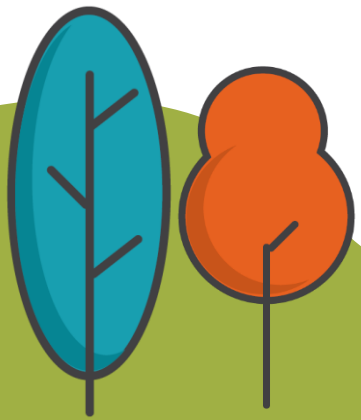
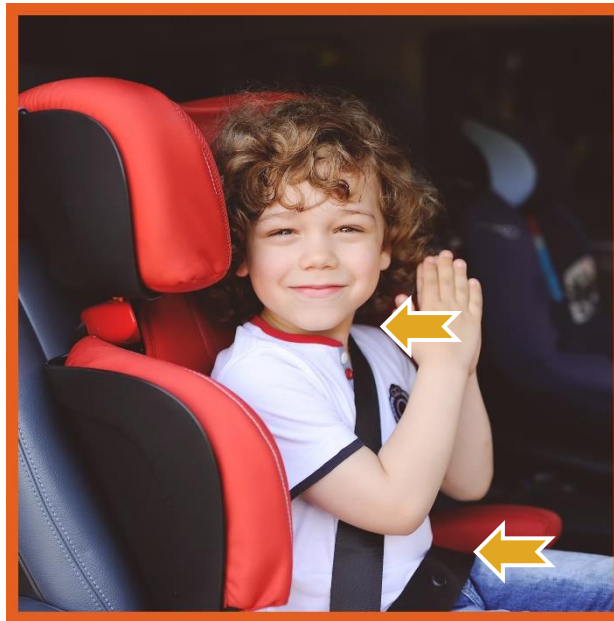
The seat belt is designed to secure over strong anchor points over your body. Until your child is tall enough, the seat belt will not fit properly. This can cause serious neck and organ damage during a crash.



# Booster Seats – Group 2 & 3

Booster seats can only be used with a 3 point seat belt and not a lap belt only. With a lap belt only there is no upper body support and your child will suffer abdominal, neck and back injuries in a crash.

Booster seats are not installed in your vehicle and they do not have a harness. It uses the seat belt to keep the child and the seat in position.

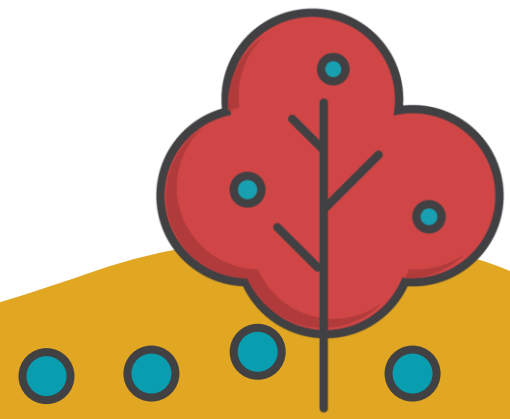
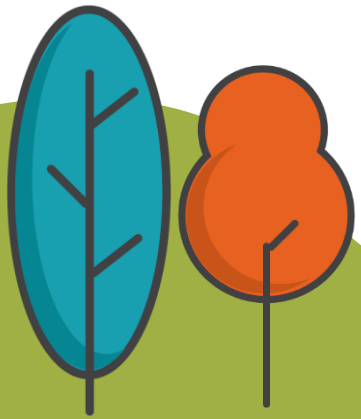
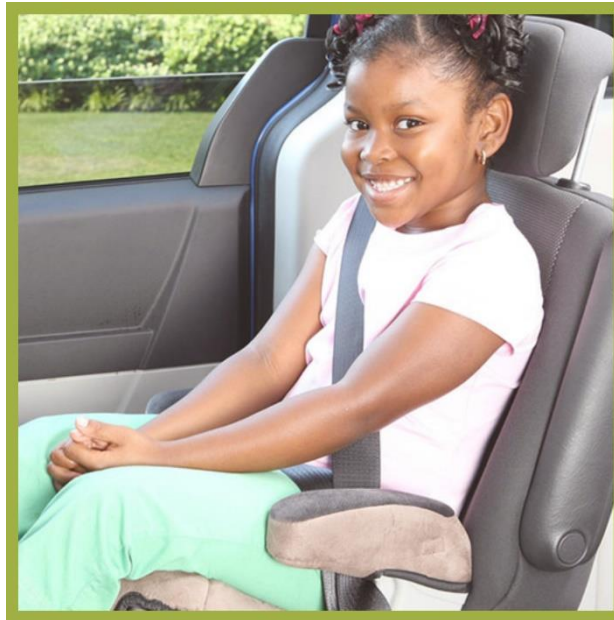




# Booster Seats – Group 2 & 3

A high back belt adjusting booster seat must be used till your child is at least 6, 25kg or 115cm tall, but preferably till they are tall enough to use the seat belt alone.

Booster cushions can be used from 6 years or 22kg **provided that they have outgrown the full back booster.**

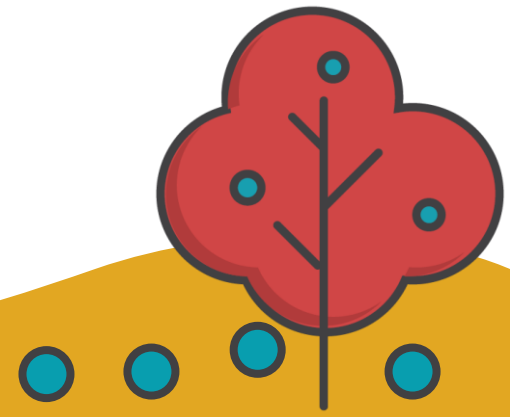
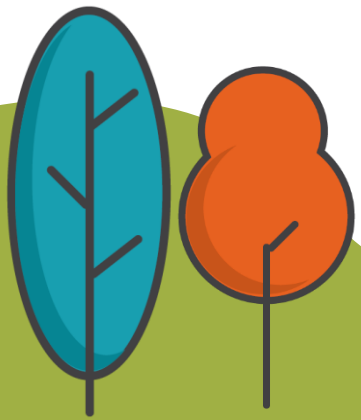


# Booster Seats – Group 2 & 3

Good side impact protection is a must.

Side impact protection provides a soft landing for the head during a crash and it minimises neck movement during a side impact crash and spin.

It also comes in handy when your little one catches a nap in the booster seat.

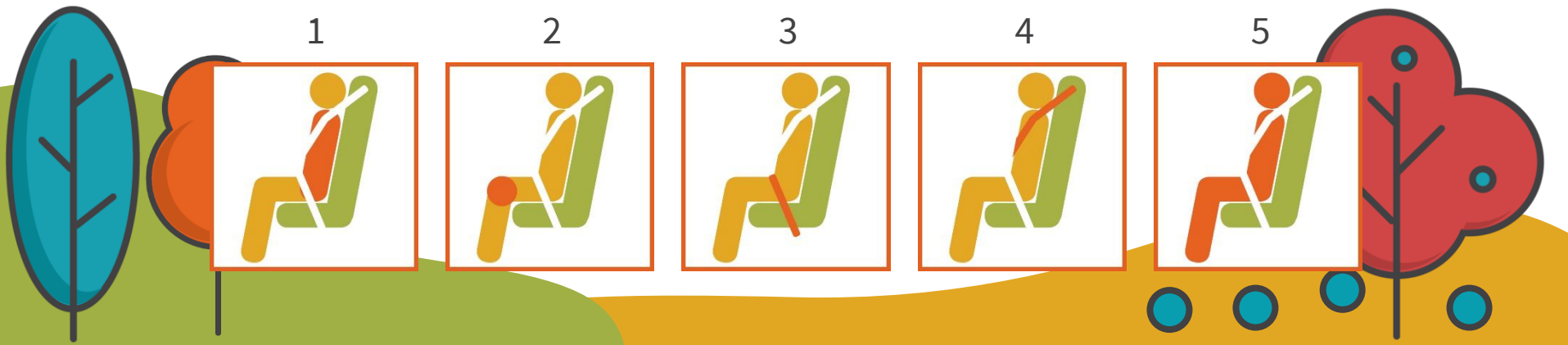


# Booster Seats – Group 2 & 3

Kids are ready to use a seat belt only when they pass the 5-point test:

1. Can they sit with their back against the back of the vehicle seat?
2. Do their legs bend comfortably over the edge of the seat?
3. Does the seat belt sit comfortably on the middle of their shoulder?
4. Does the lap belt fit low over the top of their legs?
5. Can they sit like this for the whole trip?

If they can say yes to all of these questions, they are ready for the seat belt only. Yay!!

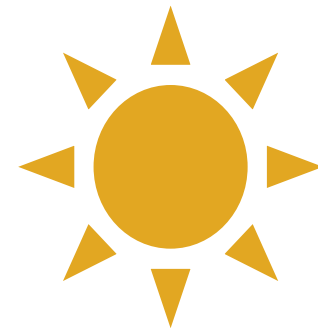
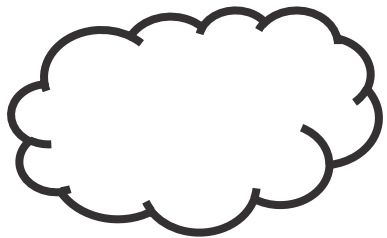


# How can you help getting kids in car seats?

Donate your used car seats at the following drop off points:

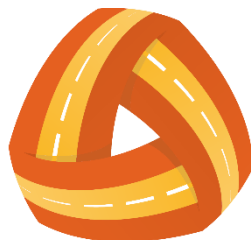
- All branches of **Supa Quick**
- All **InspectaCar** Dealerships
- All **Renault SA** dealerships
- All **Dekra** Branches
- All **Skynet** depots
- **MasterDrive**
- **Wheel Well**





# Thank you

[www.wheelwell.org.za](http://www.wheelwell.org.za)



## *Wheel Well*

FOR CHILDREN IN ROAD SAFETY

