

Science - Year 5

Animals including Humans – Block 5AH

Life Explorers

Session 2

Resource Pack

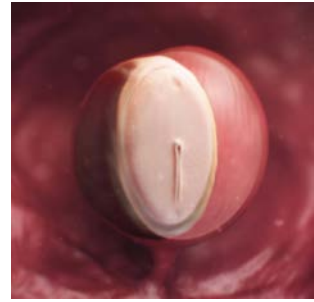
Foetus fruit and veg

Have available a range of fruit and veg that match the lengths, in cm, given. For example:

- **Poppy seed (1mm) week 4**
- **Grape (1.6cm) week 8**
- **Lemon (5.4 cm) week 12**
- **Avocado (11.6cm) week 16**
- **Coconut (25.6cm) week 20**
- **Swede (30cm) week 24**
- **Lettuce (37.6cm) week 28**
- **Turnip (42.4cm) week 32**
- **Papaya (47.4cm) week 36**
- **Pumpkin (51.2cm) week 40**

Children can order them by size and then attempt to match the foetal development statements with each month of development.

Week 4



Week 8



Week 12



Week 16



Week 20



Week 24



Week 28



Week 32



Week 36



Week 40



Foetal development statements (teacher's reference)

4 weeks

The early brain and spinal cord are developing. The heart starts to beat. Not yet a foetus – currently called an embryo

8 weeks

Intestines have started to develop and arms and legs begin to sprout. The heart has 4 chambers. Organs are beginning to work. The baby can now bend its hands at the wrist. It is still an embryo at this stage

12 weeks

Ankles, fingers and toes have formed and the embryo is now officially a foetus. Genitals are formed and the baby can even hiccup. Finger nails and toe nails are starting to develop. Eyes and ears have almost moved to their final positions

16 weeks

Eyebrows and hair are beginning to grow and facial expressions are evident. A scan can now show the sex of the baby. Lungs have started to work, inhaling and exhaling amniotic fluid, and the circulatory system and urinary tract are both fully functional

20 weeks

Baby can now kick, flex its fingers, and roll. Senses are developing: taste, smell, hearing, sight and touch are becoming more advanced. There may also be some hair on its head, and its kidneys are starting to make urine

24 weeks

Baby may now be able to hear a distorted version of its mother's voice, her heartbeat and rumbling tummy. Taste buds are fully formed and lungs are developing quickly

28 weeks

Opens and closes eyes and may be able to detect continuous bright lights outside of its mother's belly. Bones are nearly developed. It has eyebrows and eye lashes.

32 weeks

Skin is soft and smooth, and it may already have a full head of hair. Baby is getting plumper and developing layers of fat. Starts to inhale amniotic fluid to exercise its lungs

36 weeks

Continues to grow – almost ready for birth

40 weeks

Ready to be born

Foetal development statements

Match the statements to the fruit or veg for each month of foetal development

Baby can now kick, flex its fingers, and roll. Senses are developing: taste, smell, hearing, sight and touch are becoming more advanced. There may also be some hair on its head, and its kidneys are starting to make urine

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Myth or fact?

- A foetus knows what its mother looks like as soon as it is born **(Myth – they may recognise their mothers, but through other senses, not sight)**
- A foetus in its third trimester can see the sun as a glow through its mother's skin if the skin is exposed **(Fact! Babies are known to respond to torch light on their mother's belly)**
- It is possible for the baby to get a taste for spicy food **(Fact! Babies can taste what their mothers eat through the amniotic fluid around them – flavours enter the amniotic fluid from the foods eaten by the mother)**
- The shape and height of a pregnant woman's belly can indicate whether the baby is male or female **(Myth – this simply indicates where the baby is at that time)**
- A baby can recognise its mother's voice **(Fact – it hears this voice through the abdomen as well as through internal sound vibrations, while in the womb)**
- A foetus knows its mother's smell and can recognise its mother from this as soon as it is born **(Fact! A mother's smell or scent is found in the amniotic fluid, so babies when born can recognise it)**
- The type of food a mother craves indicates if it is a boy or girl **(Myth – cravings happen for a range of reasons, but the gender of the foetus is not one of them!)**
- A foetus can suck its thumb **(Fact – they may learn to do this in the womb as they explore and play)**

NHS information on foetal development

Weeks 1-3

Your weeks of pregnancy are dated from the first day of your last period. This means that in the first two weeks or so, you aren't actually pregnant – your body will be preparing for ovulation as usual. You ovulate (release an egg) around two weeks after the first day of your period.

During the third week after the first day of your last period, your fertilised egg moves along the fallopian tube towards the womb. The egg begins as a single cell, which divides again and again. By the time the egg reaches the womb, it has become a mass of more than 100 cells, called an embryo. Once in the womb, the embryo burrows into the lining of the womb. This is called implantation.

Week 4

In weeks four to five of early pregnancy, the embryo grows and develops within the lining of the womb. The outer cells reach out to form links with the mother's blood supply. The inner cells form into two, and then later, into three layers. Each of these layers will grow to be different parts of the baby's body.

The embryo is surrounded by fluid inside the amniotic sac. It's the outer layer of this sac that develops into the placenta. Cells from the placenta grow deep into the wall of the womb, establishing a rich blood supply. This ensures the baby receives all the oxygen and nutrients it needs.

Week 5

The fifth week of pregnancy is the time of the first missed period, when most women are only just beginning to think they may be pregnant. Yet already the baby's nervous system is developing, and the foundations for its major organs are in place. At this stage the embryo is around 2mm long.

A hollow tube called the neural tube forms. This will become the baby's brain and spinal cord.

At the same time, the heart is forming as a simple tube-like structure. The baby already has some of its own blood vessels and blood begins to circulate. A string of these blood vessels connects the baby and mother and will become the umbilical cord.

Week 6

By the time you are six to seven weeks pregnant, there is a large bulge where the heart is and a bump at the head end of the neural tube. This bump will become the brain and head. The embryo is curved and has a tail – it looks a bit like a small tadpole.

The heart can sometimes be seen beating on a vaginal [ultrasound scan](#) at this stage.

The developing arms and legs become visible as small swellings (limb buds). Little dimples on the side of the head will become the ears, and there are thickenings where the eyes will be. By now the embryo is covered with a thin layer of see-through skin.

Week 7

By seven weeks, the embryo has grown to about 10mm long from head to bottom. This measurement is called the "crown-rump length". The brain is growing rapidly and this results in the head growing faster than the rest of the body.

The embryo has a large forehead, and the eyes and ears continue to develop. The inner ear starts to develop, but the outer ear on the side of the head won't appear for a couple more weeks.

The limb buds start to form cartilage, which will develop into the bones of the legs and arms. The arm buds get longer and the ends flatten out – these will become the hands.

Nerve cells continue to multiply and develop as the nervous system (the brain and spinal cord) starts to take shape.

Week 8

By the time you're eight weeks pregnant, the baby is called a foetus, which means 'offspring'.

The legs are lengthening and forming cartilage too. The different parts of the leg aren't properly distinct yet – it will be a bit longer before the knees, ankles, thighs, and toes develop.

The foetus is still inside its amniotic sac, and the placenta is continuing to develop, forming structures called chorionic villi that help attach the placenta to the wall of the womb. At this stage, the foetus still gets its nourishment from the yolk sac.

Week 9

The face is slowly forming. The eyes are bigger and more obvious, and have some colour (pigment) in them. There is a mouth and tongue, with tiny taste buds. The hands and feet are developing – ridges identify where the fingers and toes will be, although they haven't separated out yet. The major internal organs (such as the heart, brain, lungs, kidneys and gut) continue developing.

At nine weeks of pregnancy, the baby has grown to about 22mm long from head to bottom.

Week 10

The ears are starting to develop on the sides of your baby's head, and inside the head its ear canals are forming.

If you could look at your baby's face you would be able to see its upper lip and two tiny nostrils in the nose. The jawbones are developing and already contain all the future milk teeth.

The heart is now fully-formed. It beats 180 times a minute – that's two to three times faster than your own heart.

The baby is making small, jerky movements which can be seen on an ultrasound scan.

Week 11

The foetus grows quickly and the placenta is rapidly developing (it will be fully formed at about 12 weeks).

The bones of the face are formed now. The eyelids are closed, and won't open for a few months yet.

The ear buds look more like ears as they grow. Your baby's head makes up one-third of its length, but the body is growing fast – it is straightening, and the fingers and toes are separating. There are fingernails.

Week 12

Just 12 weeks after your last period, the foetus is fully formed. All its organs, muscles, limbs and bones are in place, and the sex organs are well developed. From now on, it has to grow and mature. It's too early for you to be able to feel the baby's movements yet, although it's moving quite a bit.

Your baby's skeleton is made of tissue called cartilage and, around now, this starts to develop into hard bone.

Week 13

Your baby weighs around 25g. Its ovaries or testes are fully developed inside their body, and the genitals are forming outside their body. Where there was a swelling between the legs, there will now be a penis or clitoris growing, although you won't usually be able to find out the sex of your baby at an ultrasound scan at this stage.

Week 14

At 14 weeks, the baby is about 85mm long from head to bottom.

Around now, the baby begins to swallow little bits of amniotic fluid, which pass into the stomach. The kidneys start to work and the swallowed fluid passes back into the amniotic fluid as urine.

Week 15

Around this time, your baby will start to hear – it may hear muted sounds from the outside world, and any noises your digestive system makes, as well as the sound of your voice and heart.

The eyes also start to become sensitive to light. Even though your baby's eyes are closed, they may register a bright light outside your tummy.

Week 16

The muscles of the baby's face can now move and the beginnings of facial expressions appear. Your baby can't control these yet.

The nervous system continues to develop, allowing the muscles in your baby's limbs to flex. Around this time, your baby's hands can reach each other – they can form a fist, and hold each other when they touch.

17-20 weeks

By the time you're 17 weeks pregnant, your baby is growing quickly, and now weighs around 150g. The body grows bigger, so that the head and body are more in proportion.

The face begins to look much more human, and eyebrows and eyelashes are beginning to grow. Your baby's eyes can move now, although the eyelids are still shut, and the mouth can open and close.

The lines on the skin of the fingers are now formed, so the baby already has his or her own individual fingerprints. Fingernails and toenails are growing and the baby has a firm hand grip.

The baby moves around quite a bit, and may respond to loud noises from the outside world, such as music.

Your baby is putting on a bit of weight, but still doesn't have much fat, so if you could see your baby now it would look a bit wrinkled, although it will continue to put on weight for the rest of the pregnancy and will "fill out" by the last few weeks before birth.

By 20 weeks, your baby's skin is covered in a white, greasy substance called vernix. It's thought that this helps to protect the skin during the many weeks in the amniotic fluid.

21-24 weeks

By 21 weeks, your baby weighs around 350g. From about this stage onwards, your baby will weigh more than the placenta (which, until now, was heavier than your baby). The placenta will keep growing throughout pregnancy, but not as fast as your baby.

Around this time, the baby becomes covered in a very fine, soft hair called lanugo. The purpose of this isn't known, but it's thought that it may be to keep the baby at the right temperature. The lanugo usually disappears before birth.

Your baby is beginning to get into a pattern of sleeping and waking, which won't necessarily be the same as yours. When you're in bed at night, feeling relaxed and trying to sleep, your baby may be wide awake and moving about.

The lungs are not yet able to work properly, but your baby is practising breathing movements to prepare for life outside the uterus. Your baby gets all its oxygen from you via the placenta, and will do so until it is born.

By the time you are 24 weeks pregnant, the baby has a chance of survival if he or she is born. Most babies born before this time cannot live because their lungs and other vital organs are not developed enough. The care that can now be given in neonatal (baby) units means that more and more babies born early do survive.

25-28 weeks

The baby is moving about vigorously, and responds to touch and sound. A very loud noise may make him or her jump and kick, and you'll be able to feel this.

Your baby is regularly passing urine into the amniotic fluid. Sometimes the baby may get hiccups, and you can feel the jerk of each hiccup.

The baby's eyelids open for the first time and he or she will soon start blinking. It's not until some weeks after the birth that your baby's eyes become the colour that they will stay.

By now your baby's heart rate will have slowed to around 140 beats per minute. This is still considerably faster than your own heart rate.

Your baby's brain, lungs and digestive system are formed, but not fully mature – they'll spend the rest of your pregnancy developing, so that they work properly when your baby is born.

By 28 weeks, your baby weighs around 1kg and is perfectly formed. The baby's heartbeat can now be heard through a stethoscope.

Your baby continues to put on weight, as more and more fat appears under the skin.

29-32 weeks

Your baby continues to be very active at this stage, and you'll probably be aware of lots of movements.

The sucking reflex is developing by now and your baby can suck its thumb or fingers.

The baby is growing plumper and the skin begins to look less wrinkled and much smoother.

The white, greasy vernix and the soft, furry lanugo (fine hair) that have covered your baby's skin for some time begin to disappear.

Your baby's eyes can focus now. The lungs are developing rapidly, but your baby wouldn't be fully able to breathe on its own until about 36 weeks.

By about 32 weeks, the baby is usually lying with their head pointing downwards, ready for birth. This is known as cephalic presentation. The amount of amniotic fluid in your uterus is increasing, and your baby is still swallowing fluid and passing it out as urine.

33-36 weeks

By 33 weeks of pregnancy, the baby's brain and nervous system are fully developed. Your baby's bones are also continuing to harden, apart from the skull bones. These will stay soft and separated until after the birth, to make the journey through the birth canal easier – the bones can move gently and slide over each other so that the head can be born safely, while still protecting the brain.

Your baby is curled up in the uterus now, with legs bent up towards the chest. There is little room to move about, but he or she will still change position, so you'll still feel movements and be able to see them on the surface of your bump.

If your baby is a boy, his testicles are beginning to descend from his abdomen into his scrotum.

By 36 weeks, your baby's lungs are fully formed and ready to take their first breath when he or she is born. He or she will also be able to suckle for feeds now, and the digestive system is fully prepared to deal with breast milk.

37-40 weeks

At 37 weeks, your pregnancy is considered full-term.

The baby's gut (digestive system) now contains meconium – the sticky, green substance that will form your baby's first poo after birth. It may include bits of the lanugo (fine hair) that covered your baby earlier in pregnancy.

In the last weeks, some time before birth, the baby's head should move down into your pelvis. When your baby's head moves down like this, it is said to be "engaged". When this happens, you may notice that your bump seems to move down a little. Sometimes the head doesn't engage until labour starts.

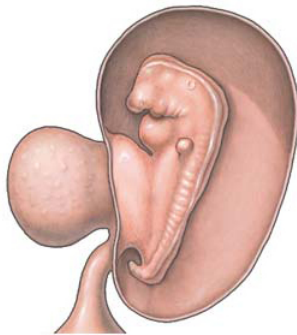
The average baby weighs around 3-4kg by now.

The lanugo that covered your baby's body is now almost all gone, although some babies may have small patches of it when they're born.

Your baby is ready to be born.

Examples of diagrams

3.5 weeks



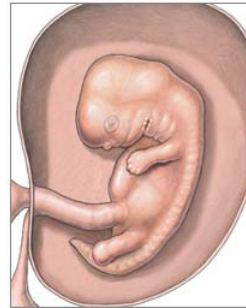
Day 1: fertilization: all human chromosomes are present; unique human life begins.

Day 6: embryo begins implantation in the uterus.

Day 22: heart begins to beat with the child's own blood, often a different type than the mothers'.

Week 3: By the end of third week the child's backbone spinal column and nervous system are forming. The liver, kidneys and intestines begin to take shape.

7.5 weeks



Week 4: By the end of week four the child is ten thousand times larger than the fertilized egg.

Week 5: Eyes, legs, and hands begin to develop.

Week 6: Brain waves are detectable; mouth and lips are present; fingernails are forming.

Week 7: Eyelids, and toes form, nose distinct. The baby is kicking and swimming.

8.5 weeks



Week 8: Every organ is in place, bones begin to replace cartilage, and fingerprints begin to form. By the 8th week the baby can begin to hear.

10 weeks



Weeks 9 and 10: Teeth begin to form, fingernails develop. The baby can turn his head, and frown. The baby can hiccup.

Weeks 10 and 11: The baby can "breathe" amniotic fluid and urinate.

12 weeks



Week 11: the baby can grasp objects placed in its hand; all organ systems are functioning. The baby has a skeletal structure, nerves, and circulation.

Week 12: The baby has all of the parts necessary to experience pain, including nerves, spinal cord, and thalamus. Vocal cords are complete. The baby can suck its thumb.

16 weeks

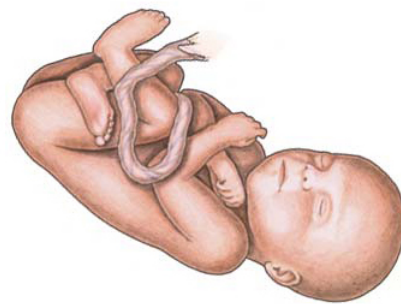


Week 14: At this age, the heart pumps several quarts of blood through the body every day.

Week 15: The baby has an adult's taste buds.

Month 4: Bone Marrow is now beginning to form. The heart is pumping 25 quarts of blood a day. By the end of month 4 the baby will be 8-10 inches in length and will weigh up to half a pound.

24 weeks



Week 17: The baby can have dream (REM) sleep.

Week 19: Babies can routinely be saved at 21 to 22 weeks after fertilization, and sometimes they can be saved even younger.

Week 20: The earliest stage at which Partial birth abortions are performed. At 20 weeks the baby recognizes its' mothers voice.

28-26 weeks



Months 5 and 6: The baby practices breathing by inhaling amniotic fluid into its developing lungs. The baby will grasp at the umbilical cord when it feels it. Most mothers feel an increase in movement, kicking, and hiccups from the baby. Oil and sweat glands are now functioning. The baby is now twelve inches long or more, and weighs up to one and a half pounds.

32-30 weeks



Months 7 through 9: Eyeteeth are present. The baby opens and closes his eyes. The baby is using four of the five senses (vision, hearing, taste, and touch.) He knows the difference between waking and sleeping, and can relate to the moods of the mother. The baby's skin begins to thicken, and a layer of fat is produced and stored beneath the skin. Antibodies are built up, and the baby's heart begins to pump 300 gallons of blood per day. Approximately one week before the birth the baby stops growing, and "drops" usually head down into the pelvic cavity.

Normal Fetal Growth

12 weeks

The fetus is 7 cm to 9 cm in length and weighs 28 g.
Fingers and toes are distinct.
Placenta is complete.
Fetal circulation is complete.
Organ systems are complete.



28 weeks

The fetus is 35 cm to 38 cm in length and weighs 1,200 g.
Skin is red.
Pupillary membrane disappears from eyes.
The fetus has an excellent chance of survival.
Eyes open and close.



16 weeks

The fetus is 10 cm to 17 cm in length and weighs 55 g to 120 g.
Sex is differentiated.
Rudimentary kidneys secrete urine.
Heartbeat is present.
Nasal septum and palate close.



32 weeks

The fetus is 38 cm to 43 cm in length and weighs 1,500 to 2,500 g.
Fetus is viable.
Eyelids open.
Fingerprints are set.
Vigorous fetal movement occurs.



20 weeks

The fetus is 25 cm in length and weighs 223 g.
Lanugo covers entire body.
Fetal movements are felt by mother.
Heart sounds are perceptible by auscultation.



36 weeks

The fetus is 42 cm to 49 cm in length and weighs 1,900 g to 2,700 g.
Face and body have a loose wrinkled appearance because of subcutaneous fat deposit.
Lanugo disappears.
Amniotic fluid decreases.



24 weeks

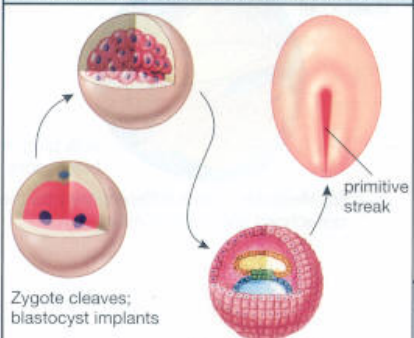
















The fetus is 28 cm to 36 cm in length and weighs 680 g.
Skin appears wrinkled.
Vernix caseosa appears.
Eyebrows and fingernails develop.



40 weeks

The fetus is 48 cm to 52 cm in length and weighs 3,000 g.
Skin is smooth.
Eyes are uniformly slate colored.
Bones of skull are ossified and nearly together at sutures.



Age (weeks)					
1	2	3	4	5	6
← zygote to formation of embryonic disc →		embryo			
 <p>Zygote cleaves; blastocyst implants</p> <p>Two-layered embryo forms; amniotic cavity and yolk sac open</p> <p>primitive streak</p>		 <p>2-3 mm</p> <p>Gastrulation occurs; notochord and beginning of neural tube form</p>	 <p>4 mm</p> <p>Neural tube closes; heart beats; arm buds, tail, and gill grooves form</p>	 <p>8 mm</p> <p>Incipient eye parts—retina (as optic cup) and lens (as lens pits)—form; leg buds form; brain enlarges</p>	 <p>13 mm</p> <p>Webbed fingers and external ear form; pigment appears in retina; tail and gill grooves disappearing</p>
Age (weeks)					
7	8	9	10	11	12
embryo		fetus			
 <p>18 mm</p> <p>Webbed toes form; bones begin to harden; back straightens; eyelids form</p>	 <p>30 mm</p> <p>Upper limbs bend at elbows; genitalia begin to differentiate; fingers are distinct</p>	 <p>50 mm</p> <p>Toes separate; eyelids develop; major parts of brain are present</p>	 <p>61 mm</p> <p>Chin grows; nostrils separate; face appears human; genitals appear male or female</p>	 <p>73 mm</p> <p>Well-defined neck appears; genitalia are complete; sucking reflex appears</p>	 <p>87 mm</p>
Age (months)					
4	5	6	7	8	9
fetus					
 <p>140 mm</p> <p>Blood cells form; all major organs form; head and body hair appear; movements are felt by mother</p>	 <p>190 mm</p>	 <p>230 mm</p> <p>Fetus may be viable if born; eyelids open; lungs and lung circulation develop; may suck thumb; fat deposited under skin</p>	 <p>270 mm</p>	 <p>300 mm</p> <p>Fetus usually viable if born; fat deposits increase; body hair is lost; head hair is well developed; most senses are well developed; fetus turns head down in uterus</p>	 <p>350 mm</p>

Length and mass of baby during pregnancy

Create a scatter diagram plotting length against mass. What does the graph line look like? What does this tell us?

Time (weeks)	Length (cm)	Mass (g)
8	1.5	1
12	6	14
16	13	100
20	25	300
24	30	600
28	37.5	1005
32	42	1700
36	47	2620
40	51	3460

Up to 20 weeks in utero, babies are measured from the top of their head to their bottom, as their legs are curled up against their bodies and are difficult to measure; from 20 weeks they are measured from the top of their heads to their heels.