

TRUE OR FALSE?

TEACHERS PLEASE NOTE

This activity is designed to support science teachers who have already covered some aspects of inheritance with their Key Stage 4 students. It is not intended as an introduction to basic genetics.

You do not need to use all the True/false statements. Simply select those which you feel are most appropriate for your students.

You might like to read through the Notes for Teachers- True or False Statements on pages 115—119 before the lesson for further information on each of the statements.

It is important to be aware of the fact that some students in the class may themselves have a genetic condition, or be a carrier, or have a relative who is affected. Sensitivity is required to avoid putting such students under stress.

You might like to explain that all the statements used in the activity are from Year 10 and 11 students in schools in England and Wales.

SUGGESTED AGE RANGE

14—16 year olds who have completed the genetics component within National Curriculum Science or its equivalent.

CURRICULUM LINKS

- Science
- National Curriculum Science (Double) at KS4, Life Processes and Living Things, Section 4: Variation, inheritance and evolution. 'Pupils should be taught:
 - that mutation is a source of genetic variation and has a number of causes;
 - how gender is determined in humans;
 - the mechanism of monohybrid inheritance where there are dominant and recessive alleles;
 - that some diseases can be inherited;
 - that the gene is a section of DNA.'
- Scottish Certificate of Education, Biology — Standard Grade, Topic 6: Inheritance. Learning outcomes, General Level - 'State that:
 - certain characteristics are determined by genetic information received from the parents;
 - each sex cell carries one set of chromosomes;
 - genes are parts of chromosomes;
 - that a characteristic is controlled by two forms of gene;
 - each parent contributes one of the two forms;
 - the meaning of the word genotype.'

OBJECTIVES

To help students to clarify what they know about chromosomes, genes and patterns of inheritance.
To tackle common genetic myths and misconceptions.

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

USING THE ACTIVITY WITH STUDENTS

You can use this activity in a number of ways:

Read out the True/False statements which you have selected asking students to stand up if they think they are True. Ask students to keep their own score.

OR

Divide students into groups of three. Give each group a set of the cut-out statements you have selected and ask them to sort the statements into three piles: TRUE, FALSE and NOT SURE.

You can use the additional information in the Notes for Teachers — True/False Statements to help you process the activity. If you have any time left over at the end of the lesson, you could ask students to discuss one or more of the following statements. The first statement is from a Year 11 student (15/16 years old) and the second and third statements are from students in Year 10 (14/15 years old):

'Genetics is an important field of science because it can lead to the development of better, healthier people.'

'One person's genes are nobody else's business.'

'Today an unhealthy gene can be replaced with a healthy gene.'

A brief commentary on each statement is included below for teacher reference.

Genetics is an important field of science because it can lead to the development of better, healthier people.

EXTENDING KNOWLEDGE

It could be said that the main purpose of genetic research is to extend our knowledge about genes and how they work in order to develop better, more effective ways of treating people with a genetic disorder and find ways of eliminating genetic disease altogether. However, it is important to distinguish between the use of the word 'better' meaning 'healthier', and 'better' meaning morally or physically superior to others.

Many people (including scientists) feel uncomfortable with the idea of genetics being used to create 'perfect' babies or 'improve' the human race and are rightly concerned that genetic technology should develop in a morally and socially responsible way. In the UK, all research into human genetics must be cleared with an ethical committee before it can begin.

One person's genes are nobody else's business. There are times when it might be important for people to reveal genetic information about themselves (for example if a would-be train driver is colour blind, or a woman with brothers and sisters of reproductive age gives birth to a child with a genetic disorder). But there is a delicate and complex balance to strike between the rights of individuals to keep genetic information to themselves and the rights of other family members/the general public to have access to this information for their own health care and/or safety.

Many people face prejudice and discrimination if they tell insurance or mortgage companies, banks and employers that they have, or are likely to develop, a genetic disorder. Until there is effective legislation which protects confidentiality and prevents the misuse of genetic information, some people might want to agree with the statement: Today an unhealthy gene can be replaced with a healthy gene.

Scientists are trying to do something like this in a form of treatment known as gene therapy. This is an experimental technique in which specially engineered viruses, or in some cases fatty particles called liposomes, are used to carry working copies of a gene into the relevant part of a person's body (e.g. the lungs of a person with cystic fibrosis, or the muscles of a boy with Duchenne muscular dystrophy).

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

The idea is to compensate for a missing or faulty gene by introducing working copies of that gene which will then help the affected cells to produce the protein they need to function properly.

So functional copies of the gene are made in a laboratory. These genes have to be inserted into the viruses or liposomes which carry them into the right cells. Those cells have to accept the new genes which then have to work properly. Although scientists have in some cases succeeded in getting working copies of a particular gene to the right cells, they have not yet found an effective way of getting them to function properly for any length of time.

OPTIONAL FOLLOW-UP ACTIVITIES

Select three of the FALSE statements used in class (or ask students to choose three themselves). Students could then be asked to write down what is wrong with the statements and why.

Students could be given some of the statements which were not used in class and asked to write down whether they think they are True or False and why.

Students could be given some of the statements not used in class together with a copy of the matching Notes for Teachers — True or false Statements (photocopied and cut out so that only the explanation is left, not the statement itself nor whether it is True or False). The students then have to decide (a) whether each statement is True or False and (b) which explanation goes with which statement.

See pages 112-116 for notes on each statement

1. A gene is a length of DNA.

TRUE

2. There is such a thing as a longevity gene which enables you to live up to 30% longer than the average human.

FALSE

3. Identical twins have the same genes.

TRUE

4. Tongue-rolling is genetic-you can either do it or you can't.

TRUE

5. If your mother is the only girl and has seven brothers and your father is one of seven boys, you are more likely to have a boy.

FALSE

6. Genes are part of a human's body which give out emotions.

FALSE

7. If you're homosexual, it's because you've got a gay gene.

FALSE

8. Genes are passed down through your biological parents.

TRUE

9. There are 23 chromosomes in a gene.

FALSE

10. Genes contain chromosomes.

FALSE

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

11. Half your genes come from your mother and half from your father.
TRUE
12. Genes can mutate.
TRUE
13. Genetic disorders are always passed on.
FALSE
14. The severity of genetic diseases decreases as they are passed through the generations.
FALSE
15. There are 46 chromosomes in all normal cells except gametes (sex cells) which have 23 chromosomes.
TRUE
16. All genetic disorders are recessive.
FALSE
17. If you have faulty genes, you have some kind of disability, no matter how slight.
FALSE
18. Genes are found on thread-like chromosomes in the nucleus of every cell.
TRUE
19. Everyone has a 'DNA fingerprint' which can be used to identify people i.e. in crime.
TRUE
20. DNA can be affected by exposure to radiation.
TRUE
21. You inherit genes from parents and that's how you get certain habits from them.
FALSE
22. Genes determine everything about you.
FALSE
23. DNA stands for deoxyribonucleic acid.
TRUE
24. Genes are passed on through blood.
FALSE
25. There are 4 types of genes - C, T, A, G.
FALSE
26. DNA can replicate.
TRUE
27. Your genes are inherited by your parents.
FALSE
28. There are 46 genes in every living cell.
FALSE
29. Humans can use their knowledge of genetics to look for a cure for genetic diseases.
TRUE

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

30. It is now possible for doctors to create the perfect baby, removing any wrong ones.

FALSE

31. Genes come equipped with buttons or zips, sometimes a belt and very rarely with stones in their pockets.

FALSE

32. A genetic description is called a 'genotype'. The physical description is called a 'phenotype'.

TRUE

33. If two recessive genes for an illness are inherited you are likely to get it.

TRUE

34. Sex cells only contain one gene.

FALSE

35. Write your own statement here;

36. Write your own statement here:

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

TRUE

TRUE OR FALSE STATEMENTS

1. A gene is a length of DNA

TRUE. DNA (deoxyribonucleic acid) is found in the nucleus of nearly every cell in the human body. Genes are sections of DNA which carry instructions for building new life. There are thought to be approximately 100,000 pairs of genes in human DNA.

2. Identical twins have the same genes.

TRUE. Identical twins are the result of a single fertilised egg cell (ovum) dividing into two. As both embryos come from the same fertilised egg they share the same DNA (in the form of chromosomes) and therefore the same genes (situated along the chromosomes). So identical twins are always both boys or both girls and look almost exactly the same as each other. Non-identical twins are the result of two independent egg cells being fertilised at the same time. As the egg cells are fertilised by different sperm, the embryos do not share the same DNA and the two babies which develop may be different sexes and look different too.

3. Tongue-rolling is genetic — you can either do it or you can't.

TRUE Tongue-rolling is an inherited characteristic. If you do not inherit the gene, you will not be able to roll your tongue, no matter how hard you try. Tongue-rolling is an example of discontinuous variation (there are only two variants — people who can roll their tongues and people who can't). Other inherited characteristics such as height are examples of continuous variation (there are many variants, from very short right through to very tall).

4. Genes are passed down through your biological parents.

TRUE. When the egg cell from your biological mother was fertilised by a sperm cell from your biological father, the chromosomes from each parent came together to form the blueprint from which you developed. But although your physical characteristics are largely determined by the genes you inherited from your biological parents, many other influences can affect how you grow and develop. So if you no longer live with your biological parents, the people who look after you and the environment you live in can affect the kind of person you are, your health, your self-esteem and your general well-being.

5. Half your genes come from your mother and half from your father.

TRUE. When a sperm fertilises an egg cell, the 23 chromosomes from each parent come together to make up the 46 chromosomes needed for the development of a new and unique human being. Genes are situated along these chromosomes, and one of each pair of genes comes from the mother and the other from the father.

6. Genes can mutate.

TRUE. This is a major source of genetic variation. Changes to the structure of DNA (mutations) can occur when DNA is copying itself - perhaps some of the letters in the genetic code change places, or get left out or copied too many times. These altered genes are then passed on to the next generation. Mutations can occur naturally but their frequency is greatly increased by mutagens (certain chemicals and types of radiation). Some mutations prove to be beneficial. Others are harmful but may not be passed on if they cause early death or place an individual at a severe disadvantage in a particular environment.

7. There are 46 chromosomes in all normal cells except gametes (sex cells) which have 23 chromosomes.

TRUE. The 23 chromosomes in each sperm and egg cell come together at fertilisation to make the 46 chromosomes needed for the development of a new human being.

8. Genes are found on thread-like chromosomes in the nucleus of every cell.

TRUE. There are approximately 100,000 pairs of genes to be found along the 46 chromosomes which exist in the nucleus of most human body cells.

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

TRUE continued

9. Everyone has a 'DNA fingerprint' which can be used to identify people i.e. in crime.

TRUE. A person's DNA contains regions which code for specific proteins (genes) and regions which do not code for anything. Some of these non-coding regions are unique to each individual and can be used to distinguish between people

Alec Jeffreys, the British professor who developed the technique of genetic fingerprinting, claimed that if someone gave him two DNA samples from different people, he could 'easily and repeatedly' distinguish them unless they came from identical twins. Identical twins share the same DNA (see answer to 3: TRUE) but everyone else's DNA is unique

So a genetic 'fingerprint' (which is not a fingerprint at all, but a 'picture' prepared by cutting, sorting and staining fragments of DNA so they can be 'read' like a bar code) can be used to see whether the DNA taken from body fluids at the scene of a crime matches the DNA of the suspect. The degree to which courts rely on DNA fingerprinting as evidence varies from country to country.

Genetic 'fingerprints' are also used in immigration and paternity cases. A child inherits half its DNA from one parent and half from the other, so scientists look to see if a child's own genetic 'fingerprint' matches part of its father's and part of its mother's. Close relatives can also be identified in this way as they will share a part of their DNA.

10. DNA can be affected by exposure to radiation.

TRUE. Our genes are continually being bombarded by different forms of background radiation (i.e. solar radiation, radiation from uranium and thorium in the soil and from radioactive potassium, phosphorus and calcium within our bodies). In most cases, our bodies have developed ways of coping with these kinds of radiation, although the thinning of the ozone layer means that we are being exposed to more unfiltered radiation from the sun than many of us are used to, which can cause our genes to mutate (change) and which increases the incidence of skin cancer

Some of us routinely come into contact with radiation as part of our health care (e.g. through medical or dental X-rays). Radiation is also used to treat cancer, and radioactive tracer materials injected into the body can aid medical diagnosis. Some people will have contact with radioactive materials in the workplace. A few will be subjected to radioactive fallout from nuclear tests and from major nuclear disasters such as Chernobyl. Uncontrolled or unsafe exposure to radiation can cause mutations in the DNA in our body cells and in our reproductive cells, which can mean that damage from radiation can continue into the next generation.

11. DNA stands for deoxyribonucleic acid.

TRUE.

12. DNA can replicate.

TRUE. Before a cell divides, the chromosomes (which are made up of very long strands of DNA) are replicated (copied). The DNA molecule is a double helix (imagine a ladder twisted round into a spiral with rungs made up of pairs of organic bases). To replicate, the DNA first separates into two strands (imagine someone cutting the ladder in two right down the middle, leaving the long support on each side with rungs sticking out). Then molecules containing more organic bases are attached to the open ends of these rungs. They can only do this in a certain way — if the open end is the base adenine, thymine will pair up with it (and vice versa). If the open end is the base cytosine, guanine will pair up with it (and vice versa). In this way, two exact copies of the original DNA are produced.

13. Humans can use their knowledge of genetics to look for a cure for genetic diseases.

TRUE. Some doctors and scientists would argue that this is the main purpose of genetic research, although curing genetic disease is difficult. Even where a cure is not likely, knowing about genes and how they work makes it easier to develop more effective drug and other treatments for specific genetic disorders.

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

TRUE continued

14. A genetic description is called a 'genotype'. The physical description is called a 'phenotype'.

TRUE. So one can describe a person's eye colour in two different ways: a) 'Tania has brown eyes' (Tania's phenotype) b) 'Tania is BB or Bb' (Tania's genotype, where 'B' represents the gene for brown eyes and 'b' the gene for blue eyes).

15. If two recessive genes for an illness are inherited you are likely to get it.

TRUE. If a person inherits two recessive genes for a genetic disorder, that person is likely to develop the disorder. Genes work in pairs. We get one copy from our mother and one copy from our father. So if you inherit one faulty and one working copy of a recessive gene, you will not develop the disorder because the working copy functions normally and hides the effects of the faulty gene. You will, however, be a carrier of that disorder (i.e. you can pass the faulty gene onto any children you may have). But if you inherit two recessive genes for a disorder (one from each parent), you have no working copies of the gene and will develop that disorder.

16. There is such a thing as a longevity gene which enables you to live up to 30% longer than the average human.

FALSE. No-one has yet located a gene/group of genes which appear to increase the lifespan of humans, although there is evidence for genes which act in this way in fruit flies.

17. If your mother is the only girl and has seven brothers and your father is one of seven boys, you are more likely to have a boy.

FALSE. The fact that boys 'run in the family' does not affect the chances of you having a boy or a girl. The sex of a baby is genetically determined by the chromosomes it receives from its parents at fertilisation. All the mother's egg cells contain 22 chromosomes plus an X chromosome. The sex of the baby depends on whether the female egg cell (ovum) is fertilised by a sperm carrying an X or Y chromosome. As roughly half of the father's sperm cells contain 22 chromosomes plus an X chromosome and half contain 22 chromosomes plus a Y chromosome, the chances of the baby being male or female are equal:

X (from the mother) + X (from the father) = XX (a girl ♀) X (from the mother) + Y (from the father) = XY (a boy ♂)

18. Genes are part of a human's body which give out emotions.

FALSE. Genes determine a person's physical characteristics. They cannot be said to 'give out emotions'.

19. If you're homosexual, it's because you've got a gay gene.

FALSE. Homosexuality may be genetic in origin, but evidence to support this theory has so far been inconclusive. In America in 1993, Dr. Dean Hamer claimed to have linked male homosexuality to a region of the X chromosome called Xq28. He extended his research in 1995 with a small study based on 33 sets of brothers, all of whom were homosexual. The study showed that 22 out of the 33 pairs (67%) shared the Xq28 DNA sequences, while among their heterosexual brothers (from 11 families) the estimated level of Xq28 sequence sharing was only 22%. But 36 pairs of sisters, all of whom were lesbian, showed no significant sharing of any of the locations tested. The researchers conclude, 'It is highly unlikely that any single genetic variation or allele will be present in all homosexual individuals or absent from all heterosexual individuals.' Researchers working with other groups of gay men have so far failed to repeat Hamer's results.

20. There are 23 chromosomes in a gene.

FALSE. This is impossible as chromosomes are made up of genes! Scientists are not yet sure exactly how many genes are situated along the 46 chromosomes found in human cells, but 100,000 pairs is a commonly quoted figure. (N.B. If the Year 11 student who made this statement had written 'There are 23 chromosomes in each human sex cell', she would have been right.)

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

21. Genes contain chromosomes.

FALSE. It is the other way round — chromosomes contain genes.

22. Genetic disorders are always passed on.

FALSE. It is important to distinguish here between a parent with a genetic disorder passing that particular disorder onto his/her child, and a parent who is not affected but is a carrier passing on a faulty copy of a gene. The answer below explores how disorders are passed on by affected parents (see answer to 16:

for further information about dominant and recessive genes). Whether a genetic disorder is passed on or not depends on a number of things: a) If the person with a genetic disorder decides not to have children, he/she will not pass on the disorder. b) If a person with a genetic disorder decides to have children, the chances of passing on the disorder will vary: If one parent has a dominant disorder (e.g. tuberous sclerosis, neurofibromatosis, Huntington's disease etc.) each (and every) child of theirs has a 50% chance of being affected by the disorder.

If one parent has a recessive disorder (e.g. sickle cell anaemia, thalassaemia, cystic fibrosis, Friedreich's ataxia etc.) each (and every) child of theirs will be a carrier of the faulty gene but will not develop the disease unless (s)he has also inherited a second copy of the faulty gene from the other parent.

If the father has an X-linked disorder (e.g. haemophilia) each daughter will be a carrier of the faulty gene, but each son will be neither a carrier nor have the disorder (unless his mother is a carrier, in which case he could inherit the faulty gene on her X chromosome and be affected by the disorder).

This is the sort of information which genetic counsellors offer people at risk of having a child affected by a genetic disorder

23. The severity of genetic diseases decreases as they are passed through the generations.

FALSE. It is true that some genetic conditions (such as tuberous sclerosis) show variable effects and degrees of 'severity' even within the same family. But there is no evidence to suggest that genetic diseases become less severe as they pass through the generations

24. All genetic disorders are recessive.

FALSE. Some genetic disorders are autosomal dominant. 'Autosomal' means that the gene can be on any chromosome except the sex chromosomes. 'Dominant' means that a person with one faulty and one working copy of the gene for a particular disorder will be affected by the disorder because the faulty copy of the gene is dominant over the working copy. Examples of autosomal dominant disorders include Huntington's disease, neurofibromatosis, and familial polycystic kidney disease.

Some genetic conditions are autosomal recessive. A person who has inherited two faulty copies of the gene for a recessive disorder (one from each parent) and no working copies of the gene will be affected by that disorder. A person with one working copy and one faulty copy of the gene for a recessive disorder will not have the condition but will be a carrier and could pass the faulty copy of the gene onto any children they may have. Examples of autosomal recessive conditions include cystic fibrosis, phenylketonuria (PKU), sickle cell anaemia and thalassaemia.

Some genetic conditions are X-linked. Generally speaking, only males are affected by X-linked conditions. This is because males only have one copy of the X chromosome while females have two copies. If there is a faulty gene on an X chromosome, the effects will not be seen in females because they usually have a working copy on their other X chromosome. But males are affected by the disorder if there is a faulty gene on their X chromosome because the Y chromosome does not contain a copy of that gene. Examples of X-linked conditions include haemophilia, Duchenne muscular dystrophy and Fragile X.

ACTIVITY SUPPORT: TEACHERS' NOTES TRUE OR FALSE?

25. If you have faulty genes, you have some kind of disability, no matter how slight.

FALSE. Everybody carries a few copies of genes that do not work well. However all of our genes come in pairs (alleles) and in most cases, one working copy of each gene is sufficient (see answer to 16: FALSE for some exceptions to this).

26. You inherit genes from parents and that's how you get certain habits from them.

FALSE. You inherit genes from your parents, not habits (although the way your parents live may well influence how you develop and the habits you form).

27. Genes determine everything about you.

FALSE. It is True that genes determine physical characteristics such as hair and eye colour, but they do not determine everything about you. Environmental factors also influence how you develop. For example, your weight will be affected by how much you eat and how much exercise you take, while how clever you are and the talents and skills you develop will depend on many things such as how much encouragement you get and what opportunities you have to learn and to practise.

28. Genes are passed on through blood.

FALSE. Genes are passed through the sex cells (the egg and the sperm). When an egg is fertilised by a sperm and then divides you can say that the genes have been passed on. So expressions like 'It's in the blood', 'Bad blood, I or, 'Their bloods don't mix well' are misleading.

29. There are four types of genes — C, T, A, G.

FALSE. The letters C, T, A and G stand for cytosine, thymine, adenine and guanine, which are the four organic bases in the centre of the DNA molecule. These bases are paired together — A with T and C with G. Genes vary in size, but a typical gene may be made up of a few thousand of these base pairs (although some genes may be much bigger or smaller than this)

30. Your genes are inherited by your parents.

FALSE. Your genes are inherited from your parents.

31. There are 46 genes in every living cell.

FALSE. There are 46 chromosomes in the nucleus of almost all the cells in the body. It is estimated that there are about 100,000 pairs of genes situated along these chromosomes

32. It is now possible for doctors to create the perfect baby, removing any wrong ones.

FALSE. It is not possible for doctors to guarantee that a baby will be born healthy. They can, however, offer pregnant women a range of prenatal tests to try and identify whether their baby is developing normally. Where there is a family history of a particular genetic disorder, they may also be able to offer a specific test to see if the fetus is affected by that condition, although not many such tests exist (remember that we have approximately 100,000 pairs of genes). If a baby is found to be affected during pregnancy through routine screening or prenatal testing, the couple will have the option of termination, but the final decision is left to them. So doctors cannot create 'perfect' babies, nor can they decide to get rid of any 'wrong' ones.

33. Genes come equipped with buttons or zips, sometimes a belt and very rarely with stones in their pockets.

FALSE. Jeans do, genes don't!

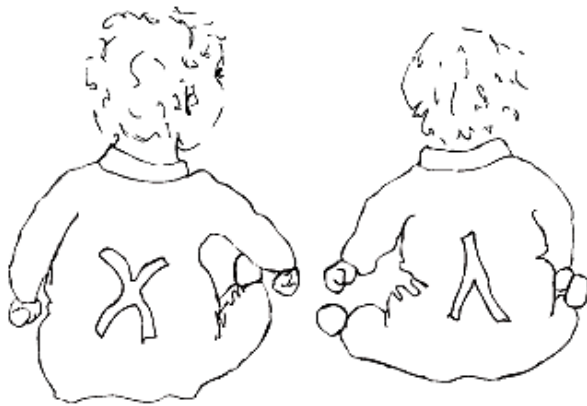
34. Sex cells only contain one gene.

FALSE. Sex cells (i.e. sperm and egg cells) contain approximately 100,000 genes, spread along 23 chromosomes.

ACTIVITY SUPPORT: TRUE OR FALSE?

TRUE OR FALSE STATEMENTS FOR STUDENTS

PHOTOCOPY, CUT UP AND PLACE SELECTED STATEMENTS IN AN ENVELOPE
(ONE ENVELOPE PER GROUP OF THREE STUDENTS).



TRUE OR FALSE STATEMENTS

1. A gene is a length of DNA
2. There is such a thing as longevity
3. Identical twins have the same genes.
4. Tongue-rolling is genetic — you can either do it or you can't.
5. If your mother is the only girl and has seven brothers and your father is one of seven boys, you are more likely to have a boy.
6. Genes are part of a human's body which give out emotions
7. If you're homosexual, it's because you've got a gay gene.
8. Genes are passed down through your biological parents.
9. There are 23 chromosomes in a gene.

10. Genes contain chromosomes.
11. Half your genes come from your mother and half from your father.
12. Genes can mutate.
13. Genetic disorders are always passed on.
14. The severity of genetic diseases decreases as they are passed through the generations.
15. There are 46 chromosomes in all normal cells except gametes (sex cells) which have 23 chromosomes.
16. All genetic disorders are recessive.
17. If you have faulty genes, you have some kind of disability, no matter how slight.
18. Genes are found on thread-like chromosomes in the nucleus of every cell.
19. Everyone has a 'DNA fingerprint' which can be used to identify people i.e. in crime.
20. DNA can be affected by exposure to radiation.
21. You inherit genes from parents and that's how you get certain habits from them
22. Genes determine everything about you.
23. DNA stands for deoxyribonucleic acid
24. Genes are passed on through blood.
25. There are 4 types of genes — C, T, A, G.
26. DNA can replicate.

27. **Your genes are inherited by your parents**
28. **There are 46 genes in every living cell.**
29. **Humans can use their knowledge of genetics to look for a cure for genetic diseases.**
30. **It is now possible for doctors to create the perfect baby, removing any wrong ones.**
31. **Genes come equipped with buttons or zips, sometimes a belt and very rarely with stones in their pockets.**
32. **A genetic description is called a 'genotype'. The physical description is called a 'phenotype'.**
33. **If two recessive genes for an illness are inherited you are likely to get it**
34. **Sex cells only contain one gene**

Write your own statement here: