

1 Astigmatism

Reading, Grammar

Find two words in each sentence that are in the wrong place and move them so that the text makes sense.

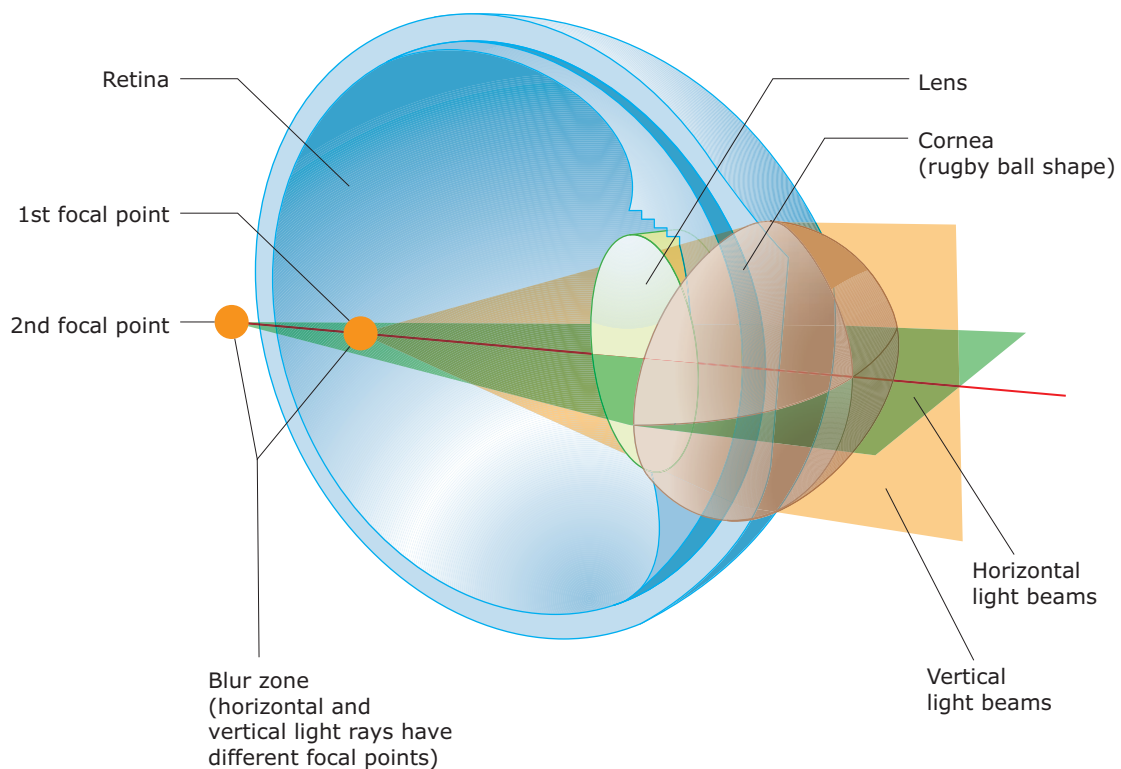
Astigmatism is a vision condition that causes vision blurred due to the irregular shape of the or cornea sometimes the curvature of the lens inside the eye. The irregularity does allow not the the light to focus properly on retina. As result a vision becomes at blurred any distance.

Astigmatism condition is a vision very common. Most people of degree have some astigmatism. Slight amounts of treatment usually don't affect vision and don't require astigmatism. But amounts larger distorted or blurred vision, eye discomfort and headaches cause.

2 Astigmatism

Speaking

Work in pairs. Look at the diagram of astigmatism. Say why people who suffer from astigmatism have blurred eyesight. How can astigmatism be corrected with glasses or contact lenses? Discuss ideas with your partner, then tell the class your ideas.



Work in pairs. Your partner has a different worksheet.

There are some gaps in this text. For each gap, write a question to find the answer. For example: 'Which people are more likely to suffer from glaucoma?'

Your partner will then ask you some questions which you can answer by reading the complete parts of your text.

When you have helped your partner complete his/her text, ask your questions and fill in the gaps.

Glaucoma is a serious problem which can be difficult to detect. It involves damage to the optic nerve, which results in the loss of a part of the field of vision. This usually happens slowly and is not easily noticeable. It often leads to complete blindness unless it can be detected early.

_____ people are more likely to suffer from glaucoma, and the risk is higher if members of your _____ have the condition. It can occur at any age, however, sometimes even before _____.

The main cause of glaucoma is increased pressure in the liquids inside the eye. The vitreous humour behind the lens does not change, but there is another liquid in front of the lens called the aqueous humour. This is produced behind the iris and drains out into the blood through tiny channels behind the cornea; it cleans the front of the eye.

If the channels that drain the aqueous humour get _____, pressure inside the eye as a whole builds up. This pressure damages the optic nerve: the cells that it destroys are not _____, and those parts of the visual _____ are not sent on to the brain.

There are two main kinds of glaucoma. Angle closure glaucoma is an acute condition in which the aqueous humour cannot pass through the pupil, usually because the iris is too close to the lens, and pressure builds up very fast. The eye becomes painful and inflamed, lights appear to be surrounded by rings of bright light, and it causes a bad headache. It needs to be treated within hours, or it can damage eyesight permanently.

Older people should have their eyes _____ regularly for open angle glaucoma, which is a _____ condition. Blind spots gradually develop where the nerve cells are damaged, but the brain _____ for them in interpreting the information from the eyes. As many as half the people with glaucoma do not know they have it. Once the blind spots become too large, however, it leads to blindness.

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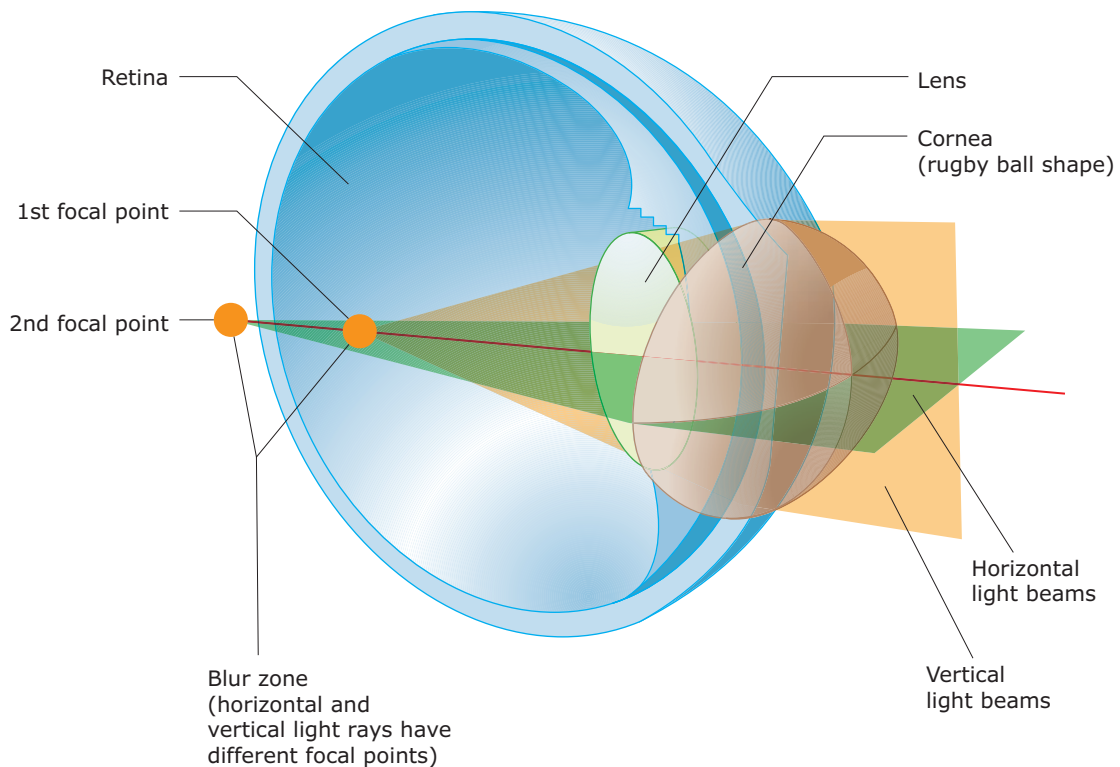
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Speaking

Work in pairs. Look at the diagram of astigmatism. Say why people who suffer from astigmatism have blurred eyesight. How can astigmatism be corrected with glasses or contact lenses? Discuss ideas with your partner, then tell the class your ideas.



Work in pairs. Your partner has a different worksheet.

There are some gaps in this text. For each gap, write a question to find the answer. For example: 'Which part of the eye does glaucoma damage?'

Ask your partner your questions and fill in the gaps in your text.

Then your partner will ask you some questions which you can answer by reading the complete parts of your text.

Glaucoma is a serious problem which can be difficult to detect. It involves damage to the _____, which results in the loss of a part of the field of vision. This usually happens _____ and is not easily noticeable. It often leads to complete _____ unless it can be detected early.

Older people are more likely to suffer from glaucoma, and the risk is higher if members of your family have the condition. It can occur at any age, however, sometimes even before birth.

The main cause of glaucoma is increased _____ in the liquids inside the eye. The vitreous humour behind the lens does not change, but there is another liquid in front of the lens called the _____ humour. This is produced behind the _____ and drains out into the blood through tiny channels behind the cornea; it cleans the front of the eye.

If the channels that drain the aqueous humour get blocked, pressure inside the eye as a whole builds up. This pressure damages the optic nerve: the cells that it destroys are not replaced, and those parts of the visual field are not sent on to the brain.

There are two main kinds of glaucoma. _____ closure glaucoma is an acute condition in which the aqueous humour cannot pass through the _____, usually because the iris is too close to the lens, and pressure builds up very fast. The eye becomes painful and inflamed, lights appear to be surrounded by rings of bright light, and it causes a bad _____. It needs to be treated within hours, or it can damage eyesight permanently.

Older people should have their eyes checked regularly for open angle glaucoma, which is a chronic condition. Blind spots gradually develop where the nerve cells are damaged, but the brain compensates for them in interpreting the information from the eyes. As many as half the people with glaucoma do not know they have it. Once the blind spots become too large, however, it leads to blindness.

Teacher's Notes and Answer Key

This worksheet will take about 45 minutes to complete. It is suitable for secondary school students of general science, biology or physics and could follow on from a general introduction to light and vision. It could also be used after the pathology of vision worksheet on everyday vision problems.

1 Astigmatism

Reading, Grammar

Aims

- to introduce astigmatism
- to see how accurate grammar is important for sense and reconstruct correct English sentences relying on comprehension of content
- to practise accurate word order

Students can work individually or in pairs. It will be helpful to allow them to check together before asking anyone to read out the final version. Both worksheets are the same for this exercise.

Key

Sentence 1: 'vision blurred' has been inverted. The adjective must precede the noun. The word 'or' is too early; it cannot separate 'the cornea', but must come after it.

Sentence 2: 'does allow not' should be 'does not allow'. One of the two consecutive 'the's before 'light' should be before 'retina' instead.

Sentence 3: 'result a' should be 'a result'. The word 'at' is too early; it cannot separate 'becomes blurred', but goes with the phrase 'at any distance'.

Sentence 4: the words 'vision' and 'condition' need to move to the end of the sentence.

Sentence 5: the words 'degree' and 'of' need to move to between 'some' and 'astigmatism'.

Sentence 6: the words 'treatment' and 'astigmatism' have been swapped.

Sentence 7: 'amounts larger' should be 'larger amounts'. The word 'cause' needs to come back from the end of the sentence to before 'distorted'.

Astigmatism is a vision condition that causes blurred vision due to the irregular shape of the cornea or sometimes the curvature of the lens inside the eye. The irregularity does not allow the light to focus properly on the retina. As a result vision becomes blurred at any distance.

Astigmatism is a very common vision condition. Most people have some degree of astigmatism. Slight amounts of astigmatism usually don't affect vision and don't require treatment. But larger amounts cause distorted or blurred vision, eye discomfort and headaches.

2 Astigmatism

Speaking

Aims

- to apply the principles studied in 2 to understand astigmatism
- to extend the description skills from 2 to a more complex situation
- to practise using English modal verbs for conjecture

You may like to start this activity with some language work on modal verbs. Also practise sentences with 'perhaps' and 'what if ... ?'

Allow the students to work in pairs (there is no difference between the worksheets here), and give them plenty of time to complete the activity before beginning whole class feedback.

Key

Astigmatism means that the cornea is an irregular shape, so that it refracts the light differently in different parts. In the diagram we can see that beams of light entering the eye on the horizontal plane reach a focal point behind the retina, while beams of light entering the eye on the vertical plane reach a focal point in front of the retina. The brain is not always able to selectively compensate for this, so vision becomes blurred.

Special glasses are needed for the correction of astigmatism, with toric lenses. These lenses are not spherical, so they refract light differently into different parts of the cornea. Toric lenses need to be individually crafted for each specific type of astigmatism to match the defects.

Slight astigmatism is often corrected with rigid contact lenses, which press on the cornea and make its shape more regular. Soft toric contact lenses can also be used, which cannot rotate and have a special shape to correct the irregularity.

A modern treatment actually changes the shape of the lens in the eye, using high-powered lasers to burn away extra tissue.

Aims

- **to learn about glaucoma**
- **to ask and answer specific questions**

There are two versions of the worksheet for this exercise. Each pair will need one copy of each of them: make sure students don't look at one another's worksheets.

Students should write out all the questions they will need first, in order to practise forming and writing the questions correctly.

The procedure will be clearer if one student finishes all the questions before the other one starts.

Key

Glaucoma is a serious problem which can be difficult to detect. It involves damage to the optic nerve, which results in the loss of a part of the field of vision. This usually happens slowly and is not noticeable. It often leads to complete blindness unless it can be detected early.

Older people are more likely to suffer from glaucoma, and the risk is higher if members of your family have the condition. It can occur at any age, however, sometimes even before birth.

The main cause of glaucoma is increased pressure in the liquids inside the eye. The vitreous humour behind the lens does not change, but there is another liquid in front of the lens called the aqueous humour. This is produced behind the iris and drains out into the blood through tiny channels behind the cornea; it cleans the front of the eye.

If the channels that drain the aqueous humour get blocked, pressure inside the eye as a whole builds up. This pressure damages the optic nerve, the cells that it destroys are not replaced, and those parts of the visual field are not sent on to the brain.

There are two main kinds of glaucoma. Angle closure glaucoma is an acute condition in which the aqueous humour cannot pass through the pupil, usually because the iris is too close to the lens, and pressure builds up very fast. The eye becomes painful and inflamed, lights appear to be surrounded by rings of brighter light, and it causes a bad headache. It needs to be treated within hours, or it can damage eyesight permanently.

Older people should have their eyes checked regularly for open angle glaucoma, which is a chronic condition. Blind spots gradually develop where the nerve cells are damaged, but the brain compensates for them in interpreting the information from the eyes. As many as half the people with glaucoma do not know they have it. Once the blind spots become too large, however, it leads to blindness.

Questions the students will need:

Which people are more likely to suffer from glaucoma? (Older people)

The risk will be higher if who has the condition? (Family members)

What is it possible for glaucoma to happen before? (Birth)

What can happen to the aqueous humour draining channels that makes pressure build up in the eye? (They get blocked)

What happens to cells that are destroyed in the optic nerve? (They are not replaced)

Parts of what are not sent to the brain if the optic nerve is damaged? (The visual field)

What should older people have done to their eyes regularly? (Have them checked)

What kind of condition is open angle glaucoma? (A chronic condition)

What does the brain do about blind spots when it interprets visual information? (It compensates for them)

Which part of the eye does glaucoma damage? (The optic nerve)

Why is glaucoma not usually noticeable? (It happens slowly)

What can glaucoma lead to if not detected early? (Blindness)

What increases in the liquids of the eye to cause glaucoma? (Pressure)

What is the liquid in front of the lens called? (The aqueous humour)

What is the aqueous humour produced behind? (The iris)

What is the acute form of glaucoma called? (Angle closure glaucoma)

What can the aqueous humour not pass through in angle closure glaucoma? (The pupil)

What symptom does angle closure glaucoma cause apart from eye inflammation and visual defects? (Headache)