

C4.2 Our field of vision

Mr. Rabe is writing something on the board when he hears Ben call out, "I've had my hand raised the whole time and you haven't called on me!" Mr. Rabe turns around and calmly responds, "Well, when I am facing the board, I cannot see that your hand is raised. I don't have eyes in the back of my head."

Everything that we can see – from left to right and from above to below – without turning our head is within our field of vision. Mr. Rabe first has to turn his head so that he can see Ben because Ben is outside of his field of vision.



Find out how large your field of vision is.



Write down your ideas and guesses:

You need the following for the experiment:

- electrical tape
- your eyes
- your thumbs



Figure 1: How to start the experiment.

**How to conduct the experiment:**

1. Stand approx. 2 meters away from the lightest possible classroom wall.
2. Stretch both of your arms forward and hold your thumbs up.
3. Direct your gaze between your thumbs and look at the wall.
4. Keeping your outstretched arms up, move them out toward your sides. Keep looking at the wall.
Attention: Do not turn your head. Keep your eyes looking straight ahead.
5. Observe how far you can stretch your arms to the side while keeping both thumbs in view.
6. No cheating! Sometimes you think that you still see your thumbs when you are really seeing your arms. For this reason, wiggle your thumbs. Can you see the movement? If not, you have to move your thumbs slightly forward again.
7. Repeat the experiment with each eye by itself. Shut the other eye each time, or let your team partner gently cover it.
8. Move through the room with one eye covered, and shake the hand of a team partner who also has one eye covered.

**Write down your observations:**

Have a team partner mark the angle of your arms on the floor using electrical tape and compare it with the other students' angles: How far can each student move his or her arms back while still seeing his or her thumbs?

Compare the field of vision of your left eye with the field of vision of your right eye and the field of vision of both eyes together. What do you notice?

Did you and your team partner immediately clasp hands when each of you had one eye closed? _____



Evaluate your observations:

Together with your team partner, find explanations for why we have two eyes. Mark an X by all correct answers.

With two eyes ...

- I can see especially precisely what is happening in my line of vision.
- I can see everything double.
- I have a larger field of vision.
- I see twice as clearly.
- I can estimate distances quite precisely.
- I can see three-dimensionally.



Doing further research:

Find out the area of your field of vision where you can see colors. You need a team partner and different colors of clay for this experiment.

Important: Your team partner should always stand behind you. You are not supposed to see what he or she is doing.

1. Stand again in front of the lightest possible classroom wall and look at it during the entire experiment.
2. Your team partner will secretly choose a certain color of clay and stick a piece on one of his or her thumbs.
3. He or she will now stand behind you, extend that arm, and wiggle that thumb while slowly moving it into your field of vision from behind you and keeping the clay pointed forward.



Figure 2: Thumb with clay.

4. As soon as you see something come into your field of vision, say “stop”, and your team partner will immediately hold his or her thumb still. You continue to look straight ahead at the wall.
5. Now you have to say what color the clay is. However, your team partner will not reveal whether you are right.
6. Then your partner will move his or her thumb farther into your field of vision until you are sure that you have recognized the color. You say “stop” again and name the color.
7. Your team partner will show you his or her thumb. What did you find out? Were you right the first time you said “stop”?
8. Repeat steps 1 to 7 with different colors and have your team partner move a thumb into your field of vision, sometimes from the left and sometimes from the right. Take turns with your team partners.

Name	Color at first stop	Color at second stop

9. Write down what you can determine through this experiment.



What is your opinion?

You are going home with your friends. You notice a boy who wants to cross the street. He is holding a walking stick and has an eye patch over his right eye. Your friend whispers to you, “Look, that boy can only see with one eye.” You nod to your friend and say, “Maybe we should help him cross the street.” Your friend frowns. “What for? The boy can’t see anything with the one eye, but his other eye is perfectly healthy. Let’s go. We’re already late.”

Think about it: What would you do?
