<table>
<thead>
<tr>
<th>Titel:</th>
<th>The Fascinating World of Cyborgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bestellnummer:</td>
<td></td>
</tr>
</tbody>
</table>
- Vor Benutzung des Arbeitsblattes wird empfohlen, den Schülern den leicht verständlichen Vortrag von Neil Harbisson auf der Webseite Ted.com ohne Untertitel zu zeigen und die Spontanreaktionen der Schüler zu analysieren.
| Inhaltsübersicht: | - Kurzbiographie von Neil Harbisson
- Abschrift des Vortrags „I listen to color“ mit Angabe der entsprechenden Webseite
- Übung zu den in den Texten verwendeten „Phrasal Verbs“
- Sprachrätsel zu den Sinnesorganen
- Grammatikregeln zum Gebrauch der Sinnesverben und Übung zur Vokabelerweiterung „Rund um unsere 5 Sinne“
- Schreibtraining: Bildbeschreibung unter Einsatz der Sinnesverben und damit verbundenen Gefühlsausdrücken
- Gruppenarbeit zur Vertiefung der verschiedenen im Arbeitsblatt angesprochenen Aspekte (eventuell Referate, Diskussionen, Filme zum Thema)
- Lösungen

Internet: http://www.School-Scout.de
E-Mail: info@School-Scout.de
When you see Neil Harbisson on stage for the first time, your first look will go to the curious, somewhat strange color combination of his garments. This is not due to the eccentric personality of the contemporary artist but it 1) **depends on** the way he perceives colors.

The son of a Catalan mother and an Irish father was born with a rare hereditary disorder called achromatopsia, which is the inability to see colors. Harbisson 2) **grew up** in Spain and studied music, drama and dance. In order to 3) **cope with** his complete lack of understanding the concept of color, first he only dressed in black and white, and at the Institute of Art he obtained a special permission to use only black, white and grey colors with the result that his early works were all in black and white.

In 2004, Neil was the first person in the world who was allowed to wear an electronic device on his passport photo as he had been able to convince the British customs authorities that the **eyeborg**, had actually become part of his body.

Some years before, Adam Montadon had met the student Neil Harbisson for the first time at Dartington College of Arts, where he was giving a lecture on practical cyborg techniques and applications; at the end of the lesson the student approached him outlining his problem. This was the start of a collaboration which should within short 4) **bring about** a dramatic change in Harbisson’s life 5) **resulting in** the development of the eyeborg, a cybernetic device with a camera mounted on the wearer's head. The camera reveals the colors in the surroundings and 6) **converts** them **into** sound waves by transposing light into sound. The initial difficulty was caused by the fact that light waves are too high to hear but by 7) **transposing** them **down**, Montadon eventually managed to arrange them within the audible wavelength. The darkest color, dark red became the lowest note. On that basis Montadon developed a software which allowed Neil to perceive the complete range of 360 hues exactly as the human eye. In the course of the years different software developers and computer specialists have 8) **contributed to** make the eyeborg more and more sophisticated, so that Neil can now perceive more colors than the human eye, such as infrared and ultraviolet.

In 2010, the artist 9) **came up with** idea of the **Cyborg Foundation**, an organization that aims at helping people find solutions to their problems transforming them into cyborgs.
Neil Harbisson is an artist. He spoke at TED Global in Edinburgh in Jun 2012. TED (Technology, Entertainment, Design) is a nonprofit 10) devoted to "ideas worth spreading," which it makes available through talks posted on its website.

"I come from a place where the sky is always grey, where flowers are always grey, and where television is still in black and white. I actually come from a world where color doesn't exist; I was born with achromatopsia, I was born completely colorblind. So I've never seen color, and I don't know what it 11) looks like. But since the age of 21, I can hear color.

In 2003, after studying fine arts and while studying music at Dartington College of Arts in England, I began a project with computer scientist Adam Montandon with the aim of extending my senses. The result, with further collaborations with Peter Kese and Matias Lizana, is an electronic eye: a color sensor between my eyes connected to a chip installed at the back of my head that transforms color frequencies into sound frequencies that I hear through my bone.

I've had the electronic eye permanently 12) attached to my head and I've been listening to colors nonstop since 2004. So I find it completely normal now to hear colors all the time. At first, I had to memorize the sound of each color, but after some time this information became subliminal, I didn't have to think about the notes, color became a perception. And after some months, color became a feeling. I started to have favorite colors and I started to dream in color.

When I started to hear colors in my dreams, I noticed that my brain and the software had united and given me a new sense. My brain was creating electronic sounds in my dreams, not the device. That was the point when I started to feel no difference between the software and my brain: The cybernetic device had become an extension of my brain -- an extension of my senses. I started to feel like a cyborg: The cybernetic eye was no longer a device but a part of my body.

After some time it even became a part of my official image. You are not allowed to appear with any electronic equipment on the UK passport photo, but I insisted that what they were seeing was not a piece of electronic equipment but a new part of my body.

Since I started to hear color, my life has changed dramatically. Art galleries have become concert halls; I can hear a Picasso or a Rothko or an Andy Warhol. And supermarkets have become like night clubs. I love how they sound, especially the aisles with cleaning products.

The way I dress has also changed. Before, I used to dress in a way that looked good, now I dress in a way that sounds good. If I'm happy I dress in a major chord. If I'm sad I dress in a minor chord. So if I need to go to a funeral, I might dress in B minor (that's turquoise, purple and orange).

My sense of beauty has also changed. Someone might look very beautiful but sound terrible, and someone might sound very harmonious but look awful. So I find it really exciting to create sound portraits of people. Instead of drawing the shape of someone's face I write down the different notes I hear when I look at them, and then I send them an mp3 of their face. Each face sounds different. I can
even give face concerts now, concerts where I play the audience faces. The good thing about doing this is that if the concert doesn't sound good, it's their fault.

I also 13) found out that things I thought were colorless are not colorless at all. Cities are not grey, Madrid is amber terracotta, Lisbon is yellow turquoise, London is very golden red... and humans are not black and white. Human skins 14) range from light shades of orange to very dark shades of orange, we are never white or black. We are all orange.

After some time, an unexpected secondary effect appeared. I started to perceive normal sounds as color too. Telephone tones started to sound green, the BBC pips became turquoise, and listening to Mozart became a yellow experience, even people's voices had dominant colors. So I started to paint the colors of music and the colors of voices.

There was a point when I was able to perceive 360 different colors, one for each degree of the color wheel. I was able to perceive colors just as well as people with color vision. Then I realized that the human visual system is not very impressive: you can't actually see many colors; there are many more colors around us that the human eye can't detect. So I just decided to continue extending my color perception and included infrared and ultraviolet into the color-to-sound scale.

So now I can also perceive infrared, which means I can hear if there are movement detectors in a room, or if someone is pointing at me with a remote control. The good thing about hearing ultraviolet is that you can hear if it's a good day or a bad day to sunbathe. Ultraviolet is a dangerous color, a color that can kill us, so it would be useful for all of us to be able to perceive it.

"Life will be much more exciting when we stop creating apps for our mobile phones and we start creating apps for our own body."

We should all have the wish to extend our senses. If we compare ourselves with other animals, our senses are very limited. Some birds can see ultraviolet, dogs can hear ultrasounds, rats can smell much better than us, sharks can detect electromagnetic field dolphins can hear through their bones, bats can see through sound.

By becoming cyborgs we have the chance to extend our perception to the level of other animal species. We 15) focus so much on extending our knowledge and focus so little on extending our senses. No matter how much I knew about color, as long as I couldn't sense color, color made no sense to me. Knowledge comes from our senses: if we extend our senses, we extend our knowledge.

We are the first generation that doesn't need to wait for natural evolution to evolve; we can evolve during our lifetime.

There's no need to create new superpowers. Nature already has them. So becoming a cyborg is not about becoming like a machine. It's not about becoming less human; it's about bringing us closer to other animals and to nature. It's about awakening our senses, our instincts, our intuition ... qualities that we seem to have lost due to our constant use of technology as an external tool and not as part of our body.

Life will be much more exciting when we stop creating apps for our mobile phones and we start creating apps for our own body.
**EXERCISE 1 – FIND THE PHRASAL VERBS REFERING TO THE BELOW LISTED SYNONYMS AND THEN USE THE PHRASAL VERBS THAT BEST FIT INTO THE GAPS OF THE SENTENCES**

<table>
<thead>
<tr>
<th>Number</th>
<th>Synonym</th>
<th>Phrasal Verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>a) to give all or most of one’s time or resources to (a person/activity)</td>
<td>a) give all or most of one’s time or resources to</td>
</tr>
<tr>
<td>2</td>
<td>b) to make something happen</td>
<td>b) make something happen</td>
</tr>
<tr>
<td>3</td>
<td>c) to fix to</td>
<td>c) fix to</td>
</tr>
<tr>
<td>4</td>
<td>d) to resemble, to have an appearance</td>
<td>d) resemble, to have an appearance</td>
</tr>
<tr>
<td>5</td>
<td>e) to extend within given limits</td>
<td>e) extend within given limits</td>
</tr>
<tr>
<td>6</td>
<td>f) to be determined by</td>
<td>f) to be determined by</td>
</tr>
<tr>
<td>7</td>
<td>g) to concentrate on something in particular</td>
<td>g) to concentrate on something in particular</td>
</tr>
<tr>
<td>8</td>
<td>h) to change something into a different thing</td>
<td>h) to change something into a different thing</td>
</tr>
<tr>
<td>9</td>
<td>i) to discover</td>
<td>i) to discover</td>
</tr>
<tr>
<td>10</td>
<td>j) to help obtain</td>
<td>j) to help obtain</td>
</tr>
<tr>
<td>11</td>
<td>k) to cause something</td>
<td>k) to cause something</td>
</tr>
<tr>
<td>12</td>
<td>l) put music in a different key from the original</td>
<td>l) put music in a different key from the original</td>
</tr>
<tr>
<td>13</td>
<td>m) have an idea/to produce</td>
<td>m) have an idea/to produce</td>
</tr>
<tr>
<td>14</td>
<td>n) to deal with something difficult obtaining a positive result</td>
<td>n) to deal with something difficult obtaining a positive result</td>
</tr>
<tr>
<td>15</td>
<td>o) to become an adult</td>
<td>o) to become an adult</td>
</tr>
</tbody>
</table>

1. He knew that his future career how well he managed in the job interview.
2. The Industrial Revolution crucial changes in economic and social matters.
3. He had to send the e-mail a second time as he had forgotten the photo his message.
4. He is a very generous person, he most of his free time looking after abandoned dogs in a kennel.
5. My sister doesn’t me, she is short, dark-haired and very slim.
6. After years of research some Indian scientists have eventually new cure for this rare disease
7. In today’s lesson I want you to the importance of our six senses.
8. It is difficult for her to three small children and a job.
10. A sudden change in the weather conditions tragedy.

---

**THE FUN CORNER**

1. What has a tongue and cannot talk?
2. What has arms but cannot give me a hug?
3. What has ears but cannot hear?
4. What has legs and cannot walk?
5. What has a head but no walk?
6. What has a shoulder but no arm?
7. What has hands but no fingers?
THE FIVE SENSES

The scientific names for the 5 senses are:
1. visual sense
2. auditory sense
3. gustatory sense
4. olfactory sense
5. tactile sense

EXERCISE 2

Complete the following table with the words from the box (attention: the words are to be inserted in alphabetical order and not all words are needed)

<table>
<thead>
<tr>
<th>SENSE</th>
<th>ORGAN</th>
<th>ASSOCIATED VERBS</th>
<th>ASSOCIATED ADJECTIVES</th>
<th>ASSOCIATED NOUNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>touch,</td>
<td>skin</td>
<td>touch,</td>
<td>soft, sticky, warm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(________)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>taste</td>
<td>tongue,</td>
<td>bitter,</td>
<td>sour, salty, sweet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>taste buds</td>
<td>taste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>smell</td>
<td>nose</td>
<td>smell,</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*this adjective can be used for two senses

Image credit: [sirup / 123RF Stock Foto](http://de.123rf.com/photo_7594886_five-senses-icons-controlled-controlled-by-brain.html)
SENSE | ORGAN | ASSOCIATED VERBS | ASSOCIATED ADJECTIVES | ASSOCIATED NOUNS
--- | --- | --- | --- | ---
sight | eyes | see, ________ | ________, ________, ________, ________ | ________, ________, ________, ________

hearing | ears | hear, ________ | ________, ________, ________, ________, ________, ________, ________, ________ | ________, ________, ________, ________, ________, ________, ________, ________

**GRAMMAR RULES REGARDING THE VERBS OF PERCEPTION**

- After verbs you generally put an adverb, but not in the case of the verbs of perception. Like the verb “to be”, these verbs always use an adjective.

  Examples:  
  - She **felt bad** because she had not told him the whole truth.  
  - I like your proposal. It really **sounds good**.  
  - I like fragrances that **smell sweet**.  
  - I **felt exhausted** after the trekking tour.

- The verb “look” only uses the adjective when it means “seem”: He looks worried. What’s happening? But: He quickly looked into the woman’s bag and took out her purse with such great skill that she didn’t notice anything.

- When you want to compare two things, use “like”:  
  - (It) feels like heaven (song by Fiction Factory)  
  - (It) sounds like life to me (song by Darryl Worley)

- Sense verbs such as feel, hear, notice, watch, see, smell, observe are followed by a direct object and either the gerund (-ing form) or the bare infinitive (infinitive without “to”):

  **The INFINITIVE** is normally used when we talk about an action that has been perceived from the beginning to the end.

  *Yesterday I saw Roger Federer play the semifinals at Montecarlo (I went to the tournament and watched the whole match)*

  **The GERUND** instead implies that only part of an action has been perceived.

  *Yesterday I saw Roger Federer playing with his sparring partner while I was walking around the tennis club. I saw him while I was walking by but I didn’t stay to watch him play*.
EXERCISE 3 – Fill in the gaps using either the bare infinitive or the gerund of the verbs in brackets

1. When I walked through the zoo I watched a lot of animals _______________ (sleep) in the shade of the trees as it was a very hot day.
2. When I woke up, I heard the rain _______________ (hit) against the window pane.
3. I heard the neighbor’s dog __________ (whine) all night? He must have been scared of the thunderstorm.
4. I noticed the driver in front of me ____________ (throw) a cigarette bud out of the car window.
5. When he opened his eyes, he saw the girl opposite him __________ (slip) her hand in the handbag of the elderly woman sitting next to her.
6. While I was walking past the museum, I noticed the beam of a torch ____________ (move) on the first floor.
7. Didn’t you hear “Pink Floyd” _______________ (play) at the stadium last month?
8. I felt my face _______________ (blush) when I understood how embarrassing the situation was.
9. Whenever I go by underground I hear some musicians _______________ (play) in order to collect some money from the people passing by but I seldom see people _____________ (stop) and ___________ (put) some coins in the shabby hat in front of them.
10. Sara heard someone ____________ (turn) the key in the keyhole and felt her body ____________ (shake) all over.
11. The detective was watching the suspect _______ (light) a cigarette when he heard the phone __________ (ring).
12. When the boy saw a cat __________ (lie) in the street he stopped but he could only watch the poor animal ___________ (die).
13. Each time I go past my favorite bar I can smell the flavor of coffee ____________ (be roasted).
14. Living with this man is like ______________ (ride) a roller coaster.
15. As soon as he had left the building, he heard the bomb ______________ (explode) and helplessly watched the entrapped people _____________ (jump) out of the windows.
EXERCISE 4 — The following picture appeals to all five senses. Imagine you are going to have a bath like that and describe your feelings and sensations. Write about 80-100 words.

THE FOLLOWING WORDS MAY BE USEFUL

FOR YOUR DESCRIPTION:


By courtesy of Cristina Turolla
Few people will actually be able to give an immediate, precise definition for the noun “cyborg” as it opens to many different interpretations. Generally speaking, a cyborg is an organism with both artificial and organic components, those human beings who depend on some electromechanical devices to control specific malfunctions of the body. The term was first defined by NASA Scientists Nathan Cline and Manfred Clynes in 1960 when discussing the advantages of a machine/human hybrid to be used in outer space.

In their paper entitled “Drugs, Space and Cybernetics” Clynes and Kline mainly consider pharmacological solutions such as drugs to keep you awake or to make you sleep for long periods, drugs to prevent poisoning by radiation, drugs to keep you strong in zero gravity. At one point in the paper, they consider nuclear-powered air exchangers to replace your lungs.

In science fiction films there are numerous examples of “half-man half-machine” beings with robotic or bionic implants, such as Robocop, a person that should be dead but is kept alive and made more powerful by technology. Being a cyborg makes him vulnerable as he is completely dependent on the devices and the software that keep him alive.

However, Cyborgs must not be confused with androids, i.e. authentic robots which look like human beings. Originally, a cyborg refers to people who need specific technological devices to compensate for some dysfunctions such as diabetes (insulin pump).

Nowadays, the word “cyborg” is mainly used to describe dependence of human beings on technology. According to this definition, anybody who uses a computer or a cellphone to carry out their daily tasks may be considered cyborgs.

In her book “A Cyborg Manifesto” Donna Haraway, an internationally recognized feminist theorist and philosopher of science and technology and Professor of Feminism and Technoscience at the European Graduate School in Switzerland, offers a different vision of the term cyborg. In her opinion, all human beings have been and still are cyborgs, a combination of biological, cultural and technological factors. The modern society is surrounded by technologies and it is almost impossible to escape that system.
There are several examples for athletes whose ambition has led them to reach incredible results thanks to the support of technological equipment. In 2009, the competitive swimmer Nadya Vessey appeared in the newspapers all over the world. Born with a dysfunction that did not allow her legs to develop properly, Nadya had both her legs amputated at the age of 16.

When she was in her Fifties she wrote to the Oscar winning Weta Workshop asking them to create a mermaid tail for her. Unexpectedly, she received a prosthesis shaped as a tail and made from wetsuit fabric. The specifically developed construction of the tail has been custom made to her and allows her to move in the water like a mermaid. Nadia Vessey began swimming after the amputation of her first leg at the age of seven and has won a lot of competitions since then.

This way of thinking about cyborgs is much more challenging than think about the negative impacts of technologies in our lives. We are shaped by the technologies, we may discard or upgrade them but while changing technologies, we change too, so tomorrow we will not be who we are today.

b) Cyborgs and disability

Disabled people are often considered as not entirely human as they make use of technologies to cope with their handicaps. This inevitably leads to discussions of ethical background, in particular to the question what it means to be human and what distinguishes people from machines. For years, the J-shaped carbon-fibre artificial limbs used by the South African runner Oscar Pistorius have been the subject of criticism and harsh disputes which in 2007 led to the amendment of the IAAF competition rules in order to prohibit the use of "any technical device that incorporates springs, wheels or any other element that provides a user with an advantage over another athlete not using such a device". Pistorious, however, continued to fight for his dream to compete alongside able bodied competitors and at the 2012 Summer Olympics, he became the first double leg amputee to participate in the Olympics as a runner in the men's 400 meters and 4 × 400 meters relay races.
SCHOOL-SCOUT • The Fascinating World of Cyborgs

SOLUTIONS

EXERCISE 1 – FIND THE PHRASAL VERBS REFERING TO THE BELOW LISTED SYNONYMS AND THEN USE THE PHRASAL VERBS THAT BEST FIT INTO THE GAPS OF THE SENTENCES

1. to grow up  a) to become an adult
2. to attach to  b) to fix to
3. to cope with  c) to deal with something difficult obtaining a positive result
4. to bring about  d) to make something happen
5. to convert into  e) to change something into a different thing
6. to depend on  f) to be determined by
7. to transpose down  g) to put music in a different key from the original
8. to come up with  h) to have an idea/to produce
9. to contribute to  i) to help obtain
10. to result in  j) to cause something
11. to devote to  k) to give all/most of one’s time or resources to (a person/activity)
12. to find out  l) to discover
13. to look like  m) to resemble, to have an appearance
14. to range from  n) to extend within given limits
15. to focus on  o) to concentrate on something in particular

1. He knew that his future career depended on how well he managed in the job interview.
2. The Industrial Revolution brought about crucial changes in the economic and social matters.
3. He had to send the e-mail a second time as he had forgotten to attach the photo to his message.
4. He is a very generous person, he devotes most of his free time to looking after abandoned dogs in a kennel.
5. My sister doesn’t look like me, she is short, dark-haired and very slim.
6. After years of research some Indian scientists have eventually come up with a new cure for this rare disease.
7. In today’s lesson I want you to focus on the importance of our six senses.
8. It is difficult for her to cope with three small children and a job.
9. I grew up in a small town near Munich.
10. A sudden change in the weather conditions resulted in tragedy.

THE FUN CORNER

1. shoes
2. armchair
3. corn
4. table
5. lettuce
6. shoulder
7. clock
EXERCISE 2

<table>
<thead>
<tr>
<th>SENSE</th>
<th>ORGAN</th>
<th>ASSOCIATED VERBS</th>
<th>ASSOCIATED ADJECTIVES</th>
<th>ASSOCIATED NOUNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>touch tact</td>
<td>skin (heart)</td>
<td>feel, grasp, touch,</td>
<td>barefoot, painful, pointed, prickly, pungent, rough, sharp, slippery, smooth, soft, sticky, warm</td>
<td>emotions, fingerprints</td>
</tr>
<tr>
<td>taste gust</td>
<td>tongue, taste-buds</td>
<td>relish, savor, taste</td>
<td>bitter, bland, juicy, pungent, salty, sour, spicy sweet, tangy,</td>
<td>bitters, flavor, insipidity</td>
</tr>
<tr>
<td>smell olf</td>
<td>nose</td>
<td>smell, sneeze, sniff</td>
<td>pungent</td>
<td>essence, fragrant, odor perfume, scent</td>
</tr>
<tr>
<td>sight vis</td>
<td>eyes</td>
<td>observe, peer, see, watch</td>
<td>blind, cockeyed, perceive, short-sighted</td>
<td>flash, fuzzy, light, tears, view</td>
</tr>
<tr>
<td>hearing aud</td>
<td>ears</td>
<td>hear, listen to, scream, sound, squeal, stutter, utter, whisper, whistle</td>
<td>loud, mute, perceive</td>
<td>earplugs, noise, sound waves,</td>
</tr>
</tbody>
</table>

EXERCISE 3 – Fill in the gaps using either the bare infinitive or the gerund of the verbs in brackets

1. When I walked through the zoo I watched a lot of animals **SLEEPING** in the shade of the trees as it was a very hot day.
2. When I woke up, I heard the rain **HITTING** against the window pane.
3. Living with this I heard the neighbor’s dog **WHINE** all night? He must have been scared of the thunderstorm.
4. I noticed the driver in front of me **THROW** a cigarette bud out of the car window.
5. When he opened his eyes, he saw the girl opposite him **SLIP** her hand in the handbag of the elderly woman sitting next to her.
6. While I was walking past the museum, I noticed the beam of a torch **MOVING** on the first floor.
7. Didn’t you hear “Pink Floyd” **PLAY** at the stadium) last month ?
8. I felt my face **BLUSH** when I understood how embarrassing the situation was.
9. Whenever I go by underground I hear some musicians **PLAYING** in order to collect some money from the people passing by but I seldom see people **STOP** and **PUT** some coins in hat in front of them.
10. Sara heard someone **TURN** the key in the keyhole and felt her body **SHAKE** all over.
11. The detective was watching the suspect **LIGHT** a cigarette when he heard the phone **RINGING**.
12. When the boy saw a cat **LYING** in the street he stopped but he could only watch the poor animal **DIE**.
13. Each time I go past my favorite bar I can smell the flavor of coffee **BEING ROASTED**.
14. Living with this man is like **RIDING** a roller coaster.
15. As soon as he had left the building, he heard the bomb **EXPLODE** and helplessly watched the entrapped people **JUMP** out of the windows

EXERCISE 4 – Individual answers

EXERCISE 5 – Individual answers