The Effect

A modern drama by Lucy Prebble

19th February 2020 – 22nd March 2020

English Theatre Frankfurt

Teachers' Resource Pack

This teachers' resource pack includes factual information as well as tasks and topics to be dealt with in the classroom. Cut and paste as you please, and please consult the official programme for additional information. Activities for students are framed for your convenience.

The Author

Lucy Prebble (born 1980) is a British playwright. She is the author of the plays *The Sugar Syndrome*, *The Effect* and *ENRON*, and adaptation writer of the television series *Secret Diary of a Call Girl*.

Prebble grew up in Haslemere, Surrey, and was educated at Guildford High School. While studying English at the University of Sheffield, Prebble wrote a short play called *Liquid*, which won the PMA Most Promising Playwright Award. She received the Distinguished Alumni Award in 2014.

Prebble subsequently won the George Devine Award for her debut play *The Sugar Syndrome* in May 2004, followed by the TMA Award for Best New Play in October 2004.

2007 saw the premiere of Prebble's first television series, *Secret Diary of a Call Girl,* starring Billie Piper. Prebble wrote for the first two of the show's four seasons, the last of which concluded in March 2011.

Her next theatre project was *ENRON,* based on the financial scandal and collapse of the American energy corporation of the same name. It was produced by theatre company Headlong at the Chichester Festival Theatre in 2009, under the direction of Rupert Goold. The production transferred first to the Royal Court and subsequently to the Noël Coward Theatre. The play earned Prebble an Olivier Award nomination for Best New Play. The production's Broadway transfer opened at the Broadhurst Theatre in April 2010 but failed to match the critical acclaim it received in the UK and closed the following month.

The Effect, which premiered at the National Theatre in 2012, won the 2012 Critics' Circle Award for Best Play. *The Effect* premiered in the US Off-Broadway at the Barrow Street Theatre on 2 March 2016, directed by David Cromer, and featuring Kati Brazda, Susannah Flood, Carter Hudson and Steve Key.

In June 2018 Prebble was elected Fellow of the Royal Society of Literature in its "40 Under 40" initiative. The same month saw the premiere of *Succession,* the HBO series about a global media family for which Prebble serves as both co-executive producer and writer.

In October 2018, London's Old Vic announced Prebble's *A Very Expensive Poison,* a stage adaptation of Luke Harding's non-fiction book of the same name. The play is about the assassination of Alexander Litvinenko by means of the invisible radioactive isotope polonium-210.

(https://en.wikipedia.org/wiki/Lucy_Prebble)

How we effect each other – An Interview with Lucy Prebble

Building from the story of a clinical drug trial gone wildly wrong, Lucy Prebble's chemical romance *The Effect* is an investigation of the brain and the chemistry of mood. With her four characters—two participating in a clinical trial and two supervising doctors with a past together—and using all the tools at her theatrical disposal, Prebble is aiming to create, "what love feels like… and what depression feels like." Read Lucy Prebble's interview with Fiona Gruber, arts writer for The Guardian, as the Melbourne Theatre Company prepared for their 2014 production of T*he Effect*.

How did you go about constructing this play?

It began with two elements, in my mind. One of which was that the setting and location of a drugs trial is inherently theatrical because it takes place in one location over a set period of time; it fulfills a sense of Aristotelian unity.

The other was much more emotional and personal, and it was to do with the feeling I wanted to create, to do with what love *feels* like, and equally on the other side, what depression *feels* like. In some way, they are oppositional to each other.

And it felt to me that this has some scientific basis, even though that's an artistic, emotional idea, because the neurotransmitters of the brain, which are acted on in antidepressants are the same as the neurotransmitters that are acted on when you fall in love.

I was very interested in seeing if it was possible to create a feeling of love on stage and also a feeling of depression and explore how real or not these things are. Because if you have two actors on stage who are kissing each other, touching each other's eyes and expressing extreme affection, we know they're actors and they're actually doing those things. We know, both from personal experience and scientific studies, that *actually* doing those things provokes feelings of affection and love for each other.

It's possible you can create love that way. People can feel in the audience that happening.

Let's talk about the real-life drug trial that inspired this play.

I remember clearly the reporting around a set of drug trials that went very wrong. Only because it wasn't something I'd ever really heard of before. That piqued my interest, because there was a lot of reporting about how horrific the injuries were of the people who were taking part in the trial, so it ran on quite a lot of front pages.

I remember thinking, "Gosh what is that world? What's there?"

You went on a drug trial.

I did go on a drugs trial. It was designed to be immunity boosting. Someone said to me when I was there that the difficult thing isn't being given a drug, it's living in an environment that's that small for that period of time. Many drugs trials are weeks long.

At the beginning of the play the main characters sign consent forms. How can you consent to something when you don't really know what's going to happen. Even the doctors don't know.

What's of interest to me is the amount we put ourselves at risk emotionally and therefore also physically—because there isn't really a divide between the emotional and the physical—when we love other people. Obviously at the heart of the play is a conversation about how we effect each other. That's of interest to me is the amount we put ourselves at risk emotionally and therefore also physically—because there isn't really a divide between the emotional and the physical—when we love other people. Obviously at the heart of the play is a conversation about how we effect each other.

(https://www.studiotheatre.org/plays/play-detail/2017-2018-the-effect. Last access: 17.02.2020)

THE CHARACTERS

At the play´s preface the main characters are not characterized but presented in a very sober way, reduced to their basic outer characteristics. The given information reduces characters to objects, which are relevant only in a certain context. The information provided by the script will be presented in italics.

CONNIE

Connie Hall – 26 years, 55 kg, 163 cm

Connie is a psychology student who takes part in a drug trial for anti depressants. On the whole she is down to earth, wants to abide by the clinic´s rules and sees this trail in part as a learning opportunity for her studies.

Outside of the clinic she has a relationship with an older man, who has children with another woman and who is currently out of town with his children. Inside the clicic she falls in love with Tristan, another participant, but doubts the authenticity of their feelings because of the drug´s possible side effects. In the course of the play she becomes more and more obsessed with Tristan. She is the only female participant.

TRISTAN

Tristan Frey – 30 years, 80 kg, 173 cm

Tristan has taken part in several trials before and has his tricks to get around the clinic´s rules and restrictions. He is very self-confident and even bold, and flirts with Connie right from the beginning. Tristan believes in his feelings being real and succeeds to win Connie over. As the play goes along, Tristan becomes more and more obsessed with Conny and more aggressive. Because of a misunderstanding concerning the application of placebos, Tristan suffers an overdose at the end of the play and loses his memory.

LORNA

Dr. Lorna James – 47 years, 59.5 kg, 169 cm

Lorna is the monitoring doctor, who suffers from depression herself. She identifies with Connie and sees Tristan as a threat to her female patient. She thinks that the results the patients (Connie and Tristan) show are due to their feelings for each other and not due to the drug. She also believes that depression is the result of outer circumstances.

TOBY

Dr. Toby Sealey – 45 years, 91 kg, 188 cm

Toby is another doctor, who, as it turns out, is in charge of controlling Lorna. He believes that the patients´ results are due to the drug and that their love is a side effect. He, in contrast to Lorna, thinks that depression is a treatable illness with its core in a malfunctioning brain. He and Lorna were a couple once and he loves her still.

SUMMARY

The modern four-person- play *The Effect* written by Lucy Prebble deals with the impact anti depressants can have on emotions and character. It deals with the supervising doctors Lorna James, who suffers from depression herself and Toby Sealey, who controls Lorna´s work. Lorna and Toby used to be a couple. We are also introduced to Tristan and Connie who meet as patients at a clinical trial and fall in love with each other not knowing if their feelings are real. Because of a misunderstanding Connie slips Tristan her pill in addition to his own and he suffers a terrible overdose, losing his memory as a result.

At the beginning of the play Connie and Tristan meet as patients of a drug trial. Tristan is immediately interested in the young woman, who is the only female person on this trial and tries to flirt with her. Connie, however, keeps her distance at first but also feels challenged by and gives in to his provocations. In the course of this trial both experience all sorts of phenomena associated with love on the one hand and side effects of the anti depressants they are taking on the other. Especially Connie wonders whether their love is real or drug-induced.

After the first dosage escalation Connie and Tristan start to get edgy and they secretly escape to an old asylum around the corner, share a cigarette and talk about their private lives and beliefs. She agrees to go traveling with him after the trial and they kiss. At this moment Doctor Lorna James enters and interrupts them. She is not amused by finding her patients outside the hospital and sends them back to their own separate beds like children. They are ordered to stay in separate rooms from this point on.

When examining Tristan´s and Connie´s MRIs, Lorna and Toby both see significant positive changes that Toby reads as the drug´s success and Lorna interprets as an effect of Tristan´s and Connie´s flirtation since one of these two is on a placebo according to her information. Only later does Toby admit that both patients are valid test subjects, because the details given to her were manipulated in order to test her on practitioner bias.

With administering the next dosage Lorna reveals her assumption to Connie by accident. Connie and Tristan both show intense restlessness, racing hearts and they feel a strong longing for each other while staying apart. At night Tristan sneaks into Connie´s bedroom and, even though they are not allowed to, they give in to the sexual tension.

The next day Connie confronts Lorna and wants to know if she or Tristan is on the placebo and learns that Tristan is supposed to be clean, which leads Connie to distance herself from him. Since Tristan gets more aggressive and paranoid and does not understand what is really going on they get into a fight in which both get hurt physically.

At the same time Lorna and Toby fight about his lie concerning the placebo and about their long past relationship which ended because of her depressions according to him.

When the final dosage is administered, Dr. Lorna James does not pay enough attention to her patients. Connie takes her pill but does not swallow it. Instead, she kisses Tristan and passes him her dosage in addition to his own. Since Tristan actually was administered the same dosage as she was, he collapses from an overdose and loses his memory as a result. While he needs to stay at the hospital, Connie comes to visit regularly and finally takes him home with her to take care of him. Dr. Lorna James blames herself for what has happened and falls into a depression. Toby visits her regularly and offers her anti depressants, which she takes at the end.

VOCABULARY

MEDICAL Vocabulary		
to suffer from something	to experience pain or show the effects of something bad	An etwas leiden
to suffer from depression	To show the effects of a depression	An einer Depression leiden
to diagnose something to be diagnosed with something to be diagnosed with a mental health problem	To recognize and name the exact character of a disease or a problem	Etwas diagnostizieren
to cure to be curable	To heal an illness often by the application of medication	Heilen Heilbar sein
to be in recovery	To get better from an illness	Sich von einer Krankheit erholen
to be pregnant	To carry a child	Schwanger sein
to use contraception	Includes all birth control methods to prevent pregnancy	Mittel zur Empfängnisverhütung anwenden
spinal column	Backbone, spine	Die Wirbelsäule
dilating pupils	Usually small black holes in one´s eyes which are unusually widened	Geweitete Pupillen
respiration control	A reflex released from the brain that lets us breathe without thinking about it	Kontrolle der Atmung
a heart rate	The rate at which your heart beats	Der Puls
a heart attack	Irregularities of the heart rate and blood supply to the heart muscle resulting in heart damage or causing the heart to stop beating	Der Herzinfarkt
seizure	Sudden violent attack of an illness of the brain (i.e. epilepsy)	Der Krampfanfall, epileptischer Anfall
transient global amnesia	Losing all memory and being able to form new memories which will get better in time	Vorübergehender Gedächtnisschwund
symptom	Signs of an illness	Symptom
reward center of the brain	Area of the brain that reacts to positive stimuli with a positive feeling	Belohnungszentrum im Gehirn
Drug	*Here:* A chemical which is given to prevent or treat an illness or disease; *also:* substance some people take because of their pleasant effects, usually illegal	*hier:* das Medikament; *auch:* Die Droge

Drug Trial	Number of tests in order to verify certain effects of drugs on people before the drug can come into the market	Arzneimitteltest
active agent	Medication which leads to an effect; compare to *placebo*	Aktiver Wirkstoff, kein Placebo
to be on a drug	To take some kind of medication	Ein Medikament nehmen
a placebo	A means of medication that does not really have an effect on the patient. Used in order to have a control group in clinical trials in order to see if a drug really works or in case patients have imagined illnesses.	Ein Plazebo, Scheinmedikament
to donate something to donate organs, blood, money...	Voluntarily	Etwas spenden Organe, Blut, Geld… spenden
to draw blood	To take blood from the veins	Blut abnehmen
blood transfusion	Blood is injected into a person´s body who is badly injured	Bluttransfusion, Blutübertragung
to increase levels of dopamine to inflate levels of dopamine	To raise levels of dopamine	Dopaminlevel erhöhen
to discharge someone	To allow someone officially to leave and go home from the hospital/prison/armed forces….	Jemanden entlassen (z.B. aus dem Krankenhaus)
Volunteers to volunteer for something	People, who offer to work for or contribute to something (often without payment)	Freiwillige
control subject	Person who takes part in a trial and does not know that he/she is given a placebo in order to validate a drug´s effect	Kontrollperson
bias	Unconscious tendency to be more interested in one person or thing over another	Voreingenommenheit
practitioner bias	A doctor´s unconscious tendency to treat patients differently because of prejudices	Voreingenommenheit der praktizierenden Ärzte
surgeon	A Doctor who is specified in medical operations	Ein Chirurg
therapist	A doctor who treats mental illnesses without medication	Ein Therapeut
psychiatrist	A doctor who treats medical illnesses with medication	Ein Psychiater
fMRI	**f**unctional **M**agnetic **R**esonance **I**maging Technique that directly measures the blood flow in the brain, thereby providing	fMRT funktionelle Magnetresonanztomographie

	information on brain activity.	
evidence for efficacy	Proof that the drug works the way it should	Beweis für Wirksamkeit
COLLOCATIONS and other useful words and phrases		
to be under the influence	To be intoxicated/ under the effect of alcohol and drugs	Unter Drogen- / Alkoholeinfluss
leasing of bodies	Providing the body in exchange for money for a limited amount of time	Das Mieten von Körpern
To take something with a pinch of salt	To not completely believe something that you are told because you think it is unlikely to be true	Etwas mit Vorsicht genießen
to put something or someone in jeopardy	To put someone or something in danger or at risk	Etwas oder jemanden einem Riskio aussetzen
to attribute success	To say or think that something went well	Erfolg zuschreiben
external/ internal causes	Reasons for an illness e.g. can be internal which means due to personal factors as abilities and feelings or external, due to environmental and social changes and situations.	Äußere/innere Ursachen
to be caused by.. (usually something negative follows)	The reason for something to happen is… (usually followed by something negative)	Von etwas verursacht werden
to have a whitey	To faint or vomit caused by drug abuse. Face gets “white” due to decreasing blood pressure.	---
A guinnea pig	A person or thing used as a subject for experiment.	*Hier:* Ein Versuchskaninchen (fig.) *auch:* ein Mehrschweinchen

Dopamine

Dopamine is known as the feel-good neurotransmitter—a chemical that ferries information between neurons. The brain releases it when we eat food that we crave or while we have sex, contributing to feelings of pleasure and satisfaction as part of the reward system. This important neurochemical boosts mood, motivation, and attention, and helps regulate movement, learning, and emotional responses.

In lab experiments, dopamine prompts a rat to press a lever for food again and again. This is no different in humans, it’s the reason why we partake in more than one helping of cake. This press-the-lever action applies to addiction as well. People with low levels of dopamine may be more prone to addiction; a person seeking pleasure via drugs or alcohol or food needs higher and higher levels of dopamine. This neurotransmitter enables us not only to see rewards but to take action to move toward them. Stimulants both legal (methyphenidate) and illegal (cocaine), increase levels of dopamine in the brain, and alter behavior accordingly. (https://www.psychologytoday.com/intl/basics/dopamine last access 17.02.2020)

THE BRAIN IN LOVE

Helen Fischer on biological aspects of love

Helen Fisher is a biological anthropologist. She's a senior research fellow at The Kinsey Institute, Indiana University, and a member of the Center For Human Evolutionary Studies in the Department of Anthropology at Rutgers University. Prior to that, she was a research associate at the American Museum of Natural History in New York City.

The following excerpt is a transcript of one of Helen Fischer´s lectures

(...)Around the world, people love. They sing for love, they dance for love, they compose poems and stories about love. They tell myths and legends about love. They pine for love, they live for love, they kill for love, and they die for love. As Walt Whitman once said, "O I would stake all for you." Anthropologists have found evidence of romantic love in 170 societies. They've never found a society that did not have it.

But love isn't always a happy experience. (…) How many people have suffered in all the millions of years of human evolution? How many people around the world are dancing with elation at this very minute? Romantic love is one of the most powerful sensations on Earth.

So, several years ago, I decided to look into the brain and study this madness. Our first study of people who were happily in love has been widely publicized, so I'm only going to say very little about it. We found activity in a tiny, little factory near the base of the brain called the ventral tegmental area. We found activity in some cells called the A10 cells, cells that actually make dopamine, a natural stimulant, and spray it to many brain regions. Indeed, this part, the VTA, is part of the brain's reward system. It's way below your cognitive thinking process. It's below your emotions. It's part of what we call the reptilian core of the brain, associated with wanting, with motivation, with focus and with craving. In fact, the same brain region where we found activity becomes active also when you feel the rush of cocaine.

But romantic love is much more than a cocaine high – at least you come down from cocaine. Romantic love is an obsession, it possesses you. You lose your sense of self. You can't stop thinking about another human being. Somebody is camping in your head. (…) And the obsession can get worse when you've been rejected.

So, right now, Lucy Brown and I, the neuroscientists on our project, are looking at the data of the people who were put into the machine after they had just been dumped.(…) We found activity in three brain regions. We found activity in the brain region, in exactly the same brain region associated with intense romantic love. What a bad deal. You know, when you've been dumped, the one thing you love to do is just forget about this human being, and then go on with your life -- but no, you just love them harder.(…) That brain system -- the reward system for wanting, for motivation, for craving, for focus --becomes more active when you can't get what you want. In this case, life's greatest prize: an appropriate mating partner.

We found activity in other brain regions also --in a brain region associated with calculating gains and losses. You're lying there, you're looking at the picture, and you're in this machine, and you're calculating what went wrong. What have I lost? As a matter of fact, Lucy and I have a little joke about this. It comes from a David Mamet play, and there's two con artists in the play, and the woman is conning the man, and the man looks at the woman and says, "Oh, you're a bad pony, I'm not going to bet on you." And indeed, it's this part of the brain, the core of the nucleus accumbens, that is becoming active as you're measuring your gains and losses. It's also the brain region that becomes active when you're willing to take enormous risks for huge gains and huge losses.

Last but not least, we found activity in a brain region associated with deep attachment to another individual. No wonder people suffer around the world, and we have so many crimes of passion. When you've been rejected in love, not only are you engulfed with feelings of romantic love, but you're feeling deep attachment to this individual. Moreover, this brain circuit for reward is working, and you're feeling intense energy, intense focus, intense motivation and the willingness to risk it all, to win life's greatest prize.

So, what have I learned from this experiment that I would like to tell the world? Foremost, I have come to think that romantic love is a drive, a basic mating drive. Not the sex drive – the sex drive gets you looking for a whole range of partners. Romantic love enables you to focus your mating energy on just one at a time, conserve your mating energy, and start the mating process with this single individual. I think of all the poetry that I've read about romantic love, what sums it up best is something that is said by Plato over 2,000 years ago. He said, "The god of love lives in a state of need. It is a need, it is an urge, it is a homeostatic imbalance. Like hunger and thirst, it's almost impossible to stamp out." I've also come to believe that romantic love is an addiction: a perfectly wonderful addiction when it's going well, and a perfectly horrible addiction when it's going poorly. And indeed, it has all of the characteristics of addiction. You focus on the person, you obsessively think about them, you crave them, you distort reality, your willingness to take enormous risks to win this person. And it's got the three main characteristics of addiction: tolerance, you need to see them more, and more, and more; withdrawals; and last: relapse. **(...)**So, (...) love is one of the most addictive substances on Earth.

(...)Our newest experiment has been hatched by my colleague, Art Aron – putting people who are reporting that they are still in love, in a long-term relationship, into the functional MRI. We've put five people in so far, and indeed, we found exactly the same thing. They're not lying. The brain areas associated with intense romantic love still become active, 25 years later.

(…) So my final statement is: love is in us. It's deeply embedded in the brain. Our challenge is to understand each other.

(https://www.ted.com/talks/helen_fisher_studies_the_brain_in_love/transcript. Last access: 17.02.2020)

Pre-watching activities

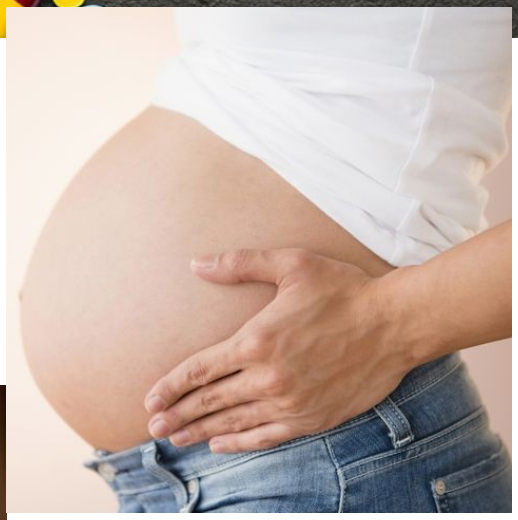
Medical Vocabulary

1. Have a look at the pictures. Match the words to the pictures.

A

B

C



D

E

1. to be pregnant
2. Dilating pupils
3. To draw blood
4. drugs
5. **f**unctional **M**agnetic **R**esonance **I**maging

A _____

B _____

C _____

D _____

E_____

The network of love

THE LOGICAL SIDE

The outer area of the brain helps determine awareness, perception, reasoning and judgment. Think of this area as the "Jerry Maguire" section of the brain — affecting why we see a partner as completing us, why we focus on one partner while ignoring all others or how we understand a partner's intentions.

THE RELAY STATION

The thalamus, a large mass of gray matter in the core of the brain, is Grand Central Station — an impulse relay center at the heart of the love network.

THE EMOTIONAL SIDE

Deep inside the brain, a complex set of structures in and around the limbic system is responsible for our emotions. This pleasure-and-reward area plays a role in how we feel, how we express what we feel and in the formation of memories both good and bad. This area is flooded with the chemical dopamine when times are great. Whether you are wholly enjoying a Five Guys burger, running a 5K race or giving a dozen long-stemmed roses to a beloved one, the euphoria generated in these feel-good areas compels us to repeat the behavior.

What do scientists hope to learn?

Neuroscientists are studying the brain to have a better understanding of how the network of love may provide physicians, psychologists and other therapists with new treatments or medicines for those who suffer from disorders associated with dysfunctional relationships, love addiction, love deprivation, unrequited love, rejection or loneliness.

Passionate love

Some areas that light up when you're in love

Are there different types of love?

Yes. In the past decade, scientists have conducted neuroimaging studies on passionate love (between beloved ones), companionate love (between friends), maternal love and unconditional love (love of others without expecting anything in return). These studies show which regions of the brain are activated by different types of love. For a person who is madly in love, for example, areas of the brain associated with enjoyment, reward, desire and euphoria are highly active.

Cupid's love potion

Falling head over heels in love happens in three phases: Lust. Attraction. Emotional attachment. During each phase, different chemicals released in the brain can elicit the best and worst from a lover: obsession, cravings, anxiety, attentiveness, aggression. "Romantic love is one of the most addictive substances on Earth," says biological anthropologist Helen Fisher.

This is your brain on chemicals and their effects on behavior

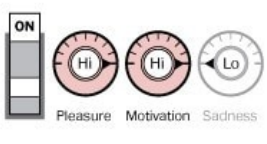
ATTRACTION PHASE: CHEMICALS FLOOD THE BRAIN AT THE BEGINNING OF A RELATIONSHIP

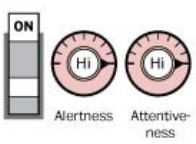
After the lust settles and the testosterone, estrogen and sexual desire take a breather, the fling becomes a thing — a monogamous relationship. Different chemicals kick into action.

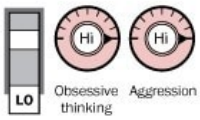
Dopamine helps control the brain's pleasure center and regulate how we respond emotionally. Dopamine is reponsible for that feeling of euphoria, similar to a drug-induced high.

Noradrenaline helps control emotions and stress. When released into the blood of starry-eyed lovers, it causes racing hearts and sweaty palms.

Serotonin helps regulate body temperature, mood and pain. Levels are low in budding relationships, which is why one may obsess over a lover or have a loss of appetite.





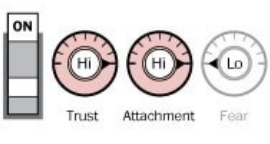


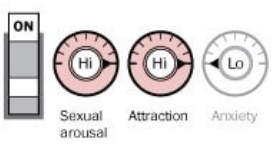
ATTACHMENT: OVER THE LONG HAUL, CHEMICALS KEEP THE JUICES FLOWING

Love's burst of chemicals tends to flame out over time, but two hormones released by the nervous system bind the hearts of soul mates.

Oxytocin, "the love hormone," is involved in attachment, sexual behavior and bonding. Levels rise while kissing or cuddling, and the hormone plays a role during sex, childbirth and breast-feeding.

Vasopressin is also believed to encourage bonding. Studies on the promiscuous male meadow vole revealed that when given extra vasopressin, it became a faithful mate.





(https://www.washingtonpost.com/national/health-science/love-is-in-the-mind-not-in-the-heart/2013/02/11/d903848a-74b6-11e2-95e4-6148e45d7adb_graphic.html. Last access: 18.02.2020)

Research task

1) Collect information on drug trials on the internet. Take notes on procedures, prerequisites for attending, reasons for attending, and risks of taking part in a drug trial. Visit at least two different websites and name your sources.

2) In class: Compare and complete your results. Analyse your sources for reliability.

3) Prepare an outline for a comment to either one of these headlines *Leasing Bodies - why I would volunteer in a Drug Trial* or *Leasing Bodies - why I would NOT volunteer in a Drug Trial*

4) Find someone who argues for the opposite statement and represent your own opinion in a discussion in English.

5) Write a comment. Remember to structure your text in introduction – body – conclusion.

Science and Technology

1a. Think: Science and technology shape every aspect of life. We are surrounded by inventions that make our lives easier, because they let us see something at night, they let us talk to friends and relatives that live far away or let us even travel to see them.

Take notes on inventions that come to your mind without which you cannot live.

1b. Share: Collect your ideas in class.

2a. Pair: Evaluate if all inventions are a positive at all times. Think of examples that are less positive.

2b. Share in class.

3. In class:

a. Choose two of the photos beneath and discuss what they have in common and how they are different.

b. Comment on which of these you consider valuable and which harmful. Give reasons.

c. Name possible dangers of new inventions. Give further examples.

Science and Technology – Pros and Cons

4a. Form small groups of 3-4 people. Use all the information you have gathered and create a mind map with advantages and limits/challenges of scientific progress.

4b. Choose one of the texts (*Science has limits* or *The Power and the Limits of Science*) and read it carefully. Highlight key words and phrases and take notes on the margin. Look up words you do not know.

4c. Complete your mind map.

5. Write a comment on the following statement:

Philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics. Scientists have become the bearers of the torch of discovery in our quest for knowledge. (Stephen Hawking)

Need more help? Use the following phrases:

Firstly,… Secondly,… Thirdly,… / Moreover,…/ Therefore,…/ Form this it follows,…/ in spite of…/ Nevertheless,… /On the one hand,... on the other hand, …/ , Besides,… / As… as…/ As far as I am concerned…/ From my point of view…/ As a matter of fact...

Science has limits: A few things that science does not do

Science is powerful. It has generated the knowledge that allows us to call a friend halfway around the world with a cell phone, vaccinate a baby against polio, build a skyscraper, and drive a car. And science helps us answer important questions like which areas might be hit by a tsunami after an earthquake, how did the hole in the ozone layer form, how can we protect our crops from pests, and who were our evolutionary ancestors? With such breadth, the reach of science might seem to be endless, but it is not. Science has definite limits.

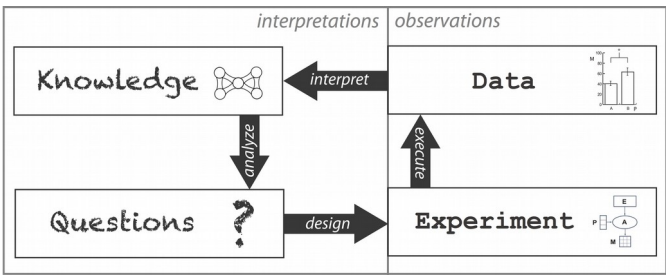
Science doesn't make moral judgments

When is euthanasia the right thing to do? What universal rights should humans have? Should other animals have rights? Questions like these are important, but scientific research will not answer them. Science can help us learn about terminal illnesses and the history of human and animal rights—and that knowledge can inform our opinions and decisions. But ultimately, individual people must make moral judgments. Science helps us describe how the world is, but it cannot make any judgments about whether that state of affairs is right, wrong, good, or bad.

Science doesn't make aesthetic judgments

Science can reveal the frequency of a G-flat and how our eyes relay information about color to our brains, but science cannot tell us whether a Beethoven symphony, a Kabuki performance, or a Jackson Pollock painting is beautiful or dreadful. Individuals make those decisions for themselves based on their own aesthetic criteria.

Science doesn't tell you how to use scientific knowledge



Although scientists often care deeply about how their discoveries are used, science itself doesn't indicate what should be done with scientific knowledge. Science, for example, can tell you how to recombine DNA in new ways, but it doesn't specify whether you should use that knowledge to correct a genetic disease, develop a bruise-resistant apple, or construct a new bacterium. For almost any important scientific advance, one can imagine both positive and negative ways that knowledge could be used. Again, science helps us describe how the world is, and then we have to decide how to use that knowledge.

Science doesn't draw conclusions about supernatural explanations

Do gods exist? Do supernatural entities intervene in human affairs? These questions may be important, but science won't help you answer them. Questions that deal

with supernatural explanations are, by definition, beyond the realm of nature—and hence, also beyond the realm of what can be studied by science. For many, such questions are matters of personal faith and spirituality.

Moral judgments, aesthetic judgments, decisions about applications of science, and conclusions about the supernatural are outside the realm of science, but that doesn't mean that these realms are unimportant. In fact, domains such as ethics, aesthetics, and religion fundamentally influence human societies and how those societies interact with science. Neither are such domains unscholarly. In fact, topics like aesthetics, morality, and theology are actively studied by philosophers, historians, and other scholars. However, questions that arise within these domains generally cannot be resolved by science.

The Power and the Limits of Science

Science's success in understanding the natural world motivates some scientists to claim that it is all-powerful and will eventually explain absolutely everything.

Science has been spectacularly successful over the past 500 years in its primary job of investigating how the natural world works. Science is wonderful but we must not become so dazzled by its great success that we conclude science is all-powerful, as some do. Apart from the scientific sphere many other spheres also exist that are vitally important for human happiness and flourishing but where science is necessarily silent.

Scientific investigation of the natural world has shown us how the world began about 14 billion years ago in the Big Bang, how the 92 natural elements are forged, how stars and planets form, how our solar system formed five billion years ago, how life began on Earth 3.8 billion years ago, how life evolved from that original simple form, the four physical forces that make everything happen, the large-scale structure of the universe – and much more. In addition to discovering these basic natural mechanisms science has also spun off countless useful applications so today the entire developed world runs on science-based technology.
Science exerts its great power by strictly limiting its investigations to impersonal interrogation of the natural physical world and only asking questions it knows it can answer. The utility of science is knowledge of natural physical mechanisms and the generation of technology. Science can give us atomic energy and cure diseases but cannot tell us whether to make peace or war or how to organise a free and just society. Science can give us power and comfort but not wisdom and happiness. Science is silent in many areas that are of the greatest important. Science is silent on values, meaning and purpose. A scientific analysis of music or painting would simply catalogue frequencies, amplitudes and chemical composition but not explain beauty. And science is silent on the supernatural. It doesn't deny the supernatural – it just has nothing to say about it.

A scientific account of something does not necessarily give us the full picture. Mathematical physicist John Polkinghorne illustrates this by considering a kettle of boiling water on a gas ring. Why is the water boiling? Science explains that the water molecules absorb energy from the gas flame, moving about faster and faster until they eventually have enough energy to overcome their mutual attraction for each other and they fly off into the gas phase – steam. The other answer to the question of why the kettle is boiling is I want to make a cup of tea. One answer tells us "how" the water boils and the other "why" it boils. Both answers are true and both are necessary to understand the bigger picture.

Science's success in understanding the natural world motivates some scientists to claim that science is all-powerful and will eventually explain absolutely everything, eg biologist Prof Richard Dawkins and chemist Prof Peter Atkins of Oxford University. And both Dawkins and physicist Stephen Hawking are dismissive of philosophy. In his book The Grand Design (2010) Hawking says "Philosophy is dead. Philosophers have not kept up with modern developments in science". I am unaware of any significant response from the philosophers.
On the other hand, Sir Peter Medawar (1975-1987), Nobel Prize Laureate (1960) in physiology or medicine, wisely draws attention to the limits of science: "That there is indeed a limit upon science is made very likely by the existence of questions that science cannot answer and that no conceivable advance of science would empower it to answer. These are the questions children ask – the

“ultimate questions” of Karl Popper. I have in mind such questions as: How did everything begin? What are we all here for? What is the point of living?”
“It is not to science therefore but to metaphysics, imaginative literature or religion that we must turn for answers to questions having to do with first and last things?” (The Limits of Science, Oxford University Press 1987).
(https://www.irishtimes.com/news/science/the-power-and-the-limits-of-science-1.3475285 Last access: 17.02.2020)

While-/ Post-Watching Activities

1. Quiz

1. Choose the correct names of the characters.

A Connie, Tristan, Lisa, Toby

B Connie, Tristan, Lorna, Toby

C Caroline, Tristan, Lorna, Toby

D Connie, Kilian, Lorna, Toby

2. What does Tristan want to use the money for after the trial?

A He wants to travel.

B He wants to buy a car.

C He wants to impress his girlfriend.

D He wants to donate it to a child care organization.

3. What does Tristan strike as peculiar about Connie at the beginning?

A She has his mother´s name.

B Her beautiful eyes

C Her funny accent

D They have the same birthday.

4. What is Connie´s boyfriend´s profession?

A He is a teacher.

B He is a handyman.

C He is a doctor.

D He is a gardener.

5. Which reason does Connie give for the success of her dry cleaning company?

A wealthy partner

B best equipment in town

C good business plan

D Lack of competition

6. What was the trick Tristan showed Connie while they were hiding in the mental asylum?

A He can juggle.

B He can do magic tricks.

C He dances.

D He can blow rings in the air with his cigarette smoke.

7. Which statement describes Dr. Lorna James´ and Dr. Toby Sealey´s relationship best?

A They are colleagues with different professional beliefs and were lovers once.

B They are colleagues and rivals because of their different professional beliefs.

C They test each other on practitioner bias.

D They are lovers.

8.Why does Connie slip Tristan her pill?

A She does not want to take hers herself and does not know of a better way to get rid of it.

B She thinks that Tristan has been on a placebo all this time.

C She wants to kill Tristan with an overdose.

D It happens by accident.

9. What happens at the end of the play?

A Connie and Tristan as well as Lorna and Toby go on a trip together and live happily ever after.

B Connie falls into a depression and leaves Tristan to his fate, Lorna finally decides to take the anti depressants.

C Tristan loses his short time memory and Lorna takes care of him because she feels guilty.

D Connie stays with Tristan and takes care of him, Toby takes care of Lorna who falls into a depression, feeling guilty for what has happened to Tristan.

10. Which statement describes the play´s main conflict best?

A Depression cannot be cured.

B In this play love is always one-sided.

C The anti depressant heightens aggression, which is why Connie and Tristan fight in spite of their love for each other.

D No one knows whether the love between Tristan and Connie is real or drug-induced because the anti depressants heighten the dopamine levels and create a similar state of mind as falling in love does.

8-10 correct answers	4-8 correct answers	0-3 correct answers
☺☺ Congratulations! You understood a lot!	☺ Quite good already! Talk to your classmates again about the show, you might tap into new levels of understanding!	😐 Don´t give up! Talk to your classmates about the parts of the show that are still a bit fuzzy to you.

1. B, 2. A, 3. D, 4. A, 5. D, 6. C, 7. A, 8. B, 9. D, 10. D

Working with the Script

2a. When Dr. Lorna James shows the MRIS scans to Toby for the first time they start to argue about the genuineness of Connie´s and Tristan´s feelings due to the drug´s influence. Read the excerpt below.

Dr. James: You think because they feel all the things one would associate with infatuation they are just… assuming that´s what they are.

Toby: Assuming, exactly. The body responds a certain way to what it´s being given, thy can´t sleep, they can´t eat, they´re in a constant state of neural excitement ever since they met, what´s the brain going to conclude?

Dr. James: You think it mistakes that for… love?

Toby: Not even mistakes it. It creates it. To make sense of the response.
[…]

Dr. James: So what? You´re thinking you´ve discovered Viagra for the heart?
[…]

Toby: I mean it rather romantically! ***Medical science has extended everyone´s lives without taking any responsibility for us having to be married longer. We could do with a bit of help.***

2b. In class: Explain Toby´s last statement in your own words.

2c. Write a short comment explaining his point of view further and naming advantages and disadvantages of his vision.
Include knowledge about advantages and limits of Science and Technology in general. Present your own opinion at the end of the essay.

3. Characterize Connie and Tristan and their understanding of the world on the basis of the following excerpt from the play. Include additional knowledge you have gathered when watching the play.

Tristan: You don´t really think that? That I only like you, cos I´m high or something.

Connie: Why not? Everything we do is just about what´s pumping around us, isn´t it?

Tristan: Well, that´s a cold way of looking at a person.

Connie: Why?! We <u>are</u> our bodies, our bodies are us,… there is not something. <u>more</u>… And that´s fine. That´s enough. It´s like, the world is incredible and beautiful, even though we know there is no god behind it. It´s even <u>more</u> amazing for that.

Tristan: Hang on. We <u>know</u> there is no God behind it?

4a. Name characteristics of falling in love. Think about feelings, behavior and physical effects.

4b. According to Helen Fischer, a biological anthropologist, love and addiction have a lot in common. Read the abstract below from one of her lectures.

> I've also come to believe that romantic love is an addiction: a perfectly wonderful addiction when it's going well, and a perfectly horrible addiction when it's going poorly.
> And indeed, it has all of the characteristics of addiction. You focus on the person, you obsessively think about them, you crave them, you distort reality, your willingness to take enormous risks to win this person. And it's got the three main characteristics of addiction: tolerance, you need to see them more, and more, and more; withdrawals; and last: relapse.

4c. Relate Fischer´s characteristics of love to *The Effect.* Refer to specific scenes in your argumentation. Name the difficulty of the comparison for this particular play.

4d. *Tristan: I can tell the difference between who I am and a side effect!*
Discuss if the characters are truly dealing with the effects of love as described by Fischer or if it is the drug that evokes "symptoms" of love.

5.a)Flashlight method: Name the first image that comes to mind when thinking about love. What kind of imagery comes up most?

b) At the end of the play Lorna suffers from "an episode" and tells Toby that she just wants to go. Discuss what she means by that.

c) He responds in declaring his love for her:
"I love you, Lorn. And it´s not romantic with… the lies of that, and it´s not family, like a genetic... trick. I just. *I´ve built a bit of my brain round you."*

Name the stylistic device, used in the statement printed in *italics*.
Is it….

A hyperbole
a parallelism
or a symbol? (More help needed?)[1]

Explain your choice.

d) Compare his declaration to the imagery you thought of. What is similar what is different? Explain why he changes common imagery and uses these exact words.

1 Hyperbole: exaggerations to create emphasis or effect. *I have told you <u>a million times</u>.*/ Parallelism: parallel sentence structure. Successive clauses or sentences that are similarly structured. *Like father, like son.* / *Symbol:* Something concrete (like a person, object, image, word or event) that stands for something abstract or invisible *cross for Christianity, dove for peace.*

6. Happily Ever After?

Tristan: People meet each other and fall in love all sorts of ways, doesn´t matter what starts it. I´m sure there´s a rush of something chemical if you meet on holiday or on a bus with a bomb on it, doesn´t mean Keanu Reeves and Sandra Bullock aren´t really in love.

Connie: What? Speed?! You´re giving me Speed?!

Tristan: I couldn´t think of a recent film.
But you think it´s fake? So what you think a few years on, Sandra and Keanu are just sat in a restaurant in silence thinking why did I marry this loser, all we had in common was a bus!

Connie: Yeah I do actually, I do!

6a. What do you think? What will have become of Tristan and Connie 15 years from now?
Find a partner, settle on a future scenario and write one to two scenes depicting Connie´s and Tristan´s future.

6b. Exchange your scenes with another group. Read the other text and give feedback. What do you like? What don´t you understand? What would you do differently?

6c. Change back your texts. Read the feedback given by the other group and revise your scenes.

6d. Practice and finally stage your scenes in front of your classmates.