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Dressing for a change : Turning knowledge into interactive action for sustainability

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SUSTAINABILITY

turning knowledge into action

Creating effective Cross-Curricular links

Implementation guide by
Natalia Moreira, Francesca Arato and Kathryn Downey

Credits

This publication was developed as a part of collaboration between the Reading International Solidarity Centre (RISC), STEMNet (the British Network of Science, Technology, Engineering and Maths), the Creative Outreach for Resource Efficiency (CORE) from the University of Manchester along with the university's outreach team.

Devised and designed by
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Written by
Natalia Moreira

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About the partners

RISC

Reading International Solidarity Centre is a Development Education Centre close to the heart of Reading's town centre. RISC works with schools and community groups to raise the profile of global issues and promote action for sustainability, human rights and social justice.

Development education promotes understanding of the links between individuals and communities and the wider world around them. It encourages critical examination of global issues, such as international development and climate change, and awareness of the impact that individuals can have on these.

It deals with a range of environmental and social justice issues, locally and globally, including peace and conflict, sustainability, interdependence, human rights and diversity.

STEMNet

The Science, Technology, Engineering and Mathematics Network is grounded on the idea of creating opportunities to inspire young people into STEM. By working with thousands of schools, colleges and STEM employers, the network increases young people of all backgrounds to meet inspiring role models, understand real world applications of STEM subjects and experience hands-on STEM activities that motivate, inspire and bring learning and career opportunities to life.

They aim to satisfy this objective by enabling all young people to achieve their potential in STEM by:

- Ensuring that all young people, regardless of background, are encouraged to understand the excitement and importance of science, technology, engineering and mathematics in their lives, and the career opportunities to which the STEM subjects can lead;
- Encouraging businesses, organisations and individuals wanting to support young people in STEM to target their efforts and resources in a way that will deliver the best results for them and young people;
- Helping all schools across the UK to understand the benefits of engaging with STEM and embedding it within curriculum planning.

CORE – Creative Outreach for Resource Efficiency

Creative Outreach for Resource Efficiency (CORE) is a project which supports the delivery of a vibrant and creative outreach programme. It encourages public and user engagement in resource efficiency and promotes understanding of the circular economy.

CORE helps academics to "get out of the lab" – supporting them to engage with new audiences, to provoke public debate, and to be visual and creative. Funded by EPSRC (Engineering and Physical Sciences Research Council), CORE work in

partnership with three research projects – also funded by EPSRC – to communicate high-impact world-class science.
In order to engage with different audiences CORE has developed several projects such as:

- Science and Art meet (at the Victoria and Albert Museum): through London-based artists the project promoted the creative, beautiful side of science;
- Recycled kayak: to portray the concept of clean transport.
- Academics wow Glastonbury: researchers of the group attended the music festival with Nik Turner (from the band Hawkwind) to explain the environmental impact of smartphones to the festival-goers on the Mandala Stage in the Green Futures Field, while being accompanied by the jamming band.
- Local school children learn about science through play: a multidisciplinary science project involving five universities covering diverse research areas including chemistry, materials engineering, design, environmental and social assessment. It covers intangible concepts such as emotional value as well as more tangible – but equally misunderstood terms – such as “closed loop recovery”.

University of Manchester Outreach – Science and Engineering

The Faculty of Engineering and Physics Sciences wants to fill young people with enthusiasm for the physical sciences, engineering and technology. The outreach team carries out a wide range of activities across all their nine schools, reflecting the strong public interest in the school’s work and in line with its aim of inspiring the next generation of scientists and engineers. The team engages in all sorts of activities which include:

- Working with schools
- Working with colleges
- Competitions
- Open Days
- Workshops for teachers
- Resources for teachers and the general public
- Hands on workshops
- Seminars
- Shows for primary and secondary aged children
- Master classes for sixth form students
- Science festivals
- Research placements
- One-day schools
- TV and media appearances
- Podcasts
- The Jodrell Bank Discovery Centre

About the Authors

Natalia Moreira

Ph.D. researcher in the School of Materials, Faculty of Physics and Engineering. Natalia is developing her research in the involvement of consumers in the development of new sustainable fashion products in the UK market.
With a background in fashion and eco-design, she has lived in several countries and uses her cultural and technical expertise to improve the interaction between sustainable SMEs in the country with current and future consumers, combining different assets throughout the textile value and supply chain.
Natalia decided to start this project as her research began to show the importance of involving the younger generations on the concepts, implications and advantages of learning and implementing sustainable behaviour.

Francesca Arato

With a MSc in Ecodesign at the Polytechnic University of Turin, Francesca has worked at Gateway National Recreation Area, National Park Service of New York City as an educational coordinator. She created educational programs for children with the aim of increasing awareness about environmental issues in the local community. She then worked as an environmental educator and at the London Borough of Bexley to promote sustainability in all the schools of the Borough. She creates interactive designs to motivate people's interest in learning about environmental sustainability and to let people feeling protagonist of the change.
Francesca decided to work on this project for her passion to spread the message of sustainability as she thinks that education is one of the key for a change that starts from people's behaviour.

Kathryn Downey

Ph.D. researcher in the School of Materials, Faculty of Physics and Engineering. Kathryn is looking at developing digital interventions for healthcare services within the UK. Her research explores participatory design in partnership with patients, their families and healthcare practitioners in order to create devices that blend personal and medical needs. Plymouth University graduate, Kathryn studied Fashion and textile design, which culminated in two Masters degree in design and enterprises at the Manchester Metropolitan University and at the University of Manchester.

She has spent, prior to the PhD, 6 years working for a corporate company. Kathryn's involvement in the project was oriented by her interest in working with education and passion for sustainability.

As part of the Nuffield Research Placement, two college students, Lara Garett and Mobeen Khan joined the development team to ensure the activities and outcomes were suitable for the age range this programme was targeting (ideally adolescents). During the 4 week placements the students analysed action and participatory research methods, researched curiosities and essential contents for the workshops and tested the games, as well as the activities of the programme. Gaining an insight of interactive academia.

Introduction

The clothing industry tends to be dwarfed by the more regulated and technical industries. However, it is one of the few businesses that has a direct influence over most of the population, being a great assimilation for dealing with the complexity of an ecological system which involves not only supply chain and manufacturing management, but also socio-economic aspects of it.
The workshop being proposed here aims at creating a connection between the technical and social aspects of sustainability in the clothing industry. In an approachable manner it aims to inspire the attendees and enable them to develop the information towards other agents of change (students, colleagues, industries, etc.), thus measuring attitudinal change as a tool to generate effective behaviour transformation.
Based on interactive activities to instigate daily associations between pieces of garment, its production and how simple choices can influence behaviour and decisions across the globe. The workshop will be developed as a part of a research being carried out between the PhD student at the University of Manchester and the Reading International Solidarity Centre (RISC – www.risc.org.uk), targeting the understanding of the global citizenship and the individual's participation in the products life cycle.
Sustainable behaviour has being growing as a trend since it was declared essential for the development of the future generations in the 70s. Dealing with sustainability has become a common practice in ecologically aware countries, where the industry, services and household practices are carried out to satisfy the eco-agenda.

General Background

Since the United Nations conference on the human environment in 1972, many terms and concepts surrounding sustainable development have been developed aiming to create less environmental devastation, increase organic compounds, decrease 'ecotoxity', improve greenhouse emissions and carbon footprints,emphasise economic benefits and raise social concern. Sustainable development embraces all of these concepts into one, dividing itself into six main characteristics (Peattie & Belz 2010): ecological and social significance; life cycle orientation; deal globally with socio-ecological problems; be competitive; guarantee customer's satisfaction; and above all, continuously improve in these matters.
Directly responsible for nearly US$1.7 trillion, as well as the employment of 75 million people in 2012 (Fashion United Group 2014), the apparel industry is also one of the few industries to be directly relatable to most population in the world. Its

importance however tends to be overshadowed by more technological industries such as aerospace or automotive.
The textile industry in general is well known for its 'toxic trail' (Brigden, Casper, Cobbing & Crawford 2012): from the production of highly water-demanding cotton, to the chemicals used in the dyeing process, the social damage of its production in extremely poor countries and the damage caused by its disposal and even washing processes (Rees et al. 1958; Brigden, Casper, Cobbing, Crawford, et al. 2012; Déri 2013).
Besides dressing and accessorising the population this highly polluting industry is widely spread around the globe. Since 2013 the World Wildlife Fund and Greenpeace have been working on campaigns to raise awareness of the hazards and dangers of the textile and fashion industries.
Currently representing 22% of the United Kingdom economy (Rush et al. 2010), around £26 billion, the British Fashion Industry is famous worldwide for being innovative and trend setting having one of the most famous Fashion Weeks in the world: London Fashion Week. Not only for the illustrious names, brands and producers, the UK is showcased for its quality, attention to details and constant break of paradigms.
Within this scenario, how does the consumer perceive their participation in this industry? When buying a new car or shopping for food, the British consumer has already changed their mind-set towards healthier and more sustainable options. However, when it comes to dressing those important assets are ignored and the price and quantity tend to be the main decision criteria. Rarely people will choose to leave their houses naked, so why not consider this piece of daily life an important aspect of sustainability?

Aims

This document outlines a set of activities (which can be implemented individually or as an 8 hour pack – which can be distributed as deemed relevant) developed in an attempt to clarify simple connections between sustainability and individuals' daily lives. The activities use (in many situations) the globalised textile industry as a universal example, which can be understood by pupils between the ages of 11 and 18, as well as older college and university students.
Through the well-developed set of activities and discussions the participant will be able to understand: (i) sustainability; (ii) its main aspects - social, environmental and economic; and (iii) daily implications. The activities were created as a competition to ensure the students' interaction and to increase participation and motivation through a 'layered games' approach (learn by doing).
Developed as a two month activity pack (one hour per week), this programme can easily be divided into single activities to be carried out as the teacher wants, cancelling activities, focusing on games as extra-curricular alternatives, etc. The

only activity that would require more preparation would be the Bear's Den which is grounded on a six day implementation (which builds up to the proposal of a sustainable fashion company).
There is additional background and expected outcomes outlined for each activity for all the activities, please make sure to read this information to ensure the learning outcomes and proper impact to be achieved.

Curriculum links

All the activities presented in this manual are linked to the British National Curriculum and can be evaluated as follows.

English

The overarching aim for English in the national curriculum is to promote high standards of language and literacy by equipping pupils with a strong command of the spoken and written word and [...] use discussion in order to learn; they should be able to elaborate and explain clearly their understanding and ideas.

Spoken English

Pupils should be taught to:

- Speak confidently and effectively, including through:
- Using Standard English confidently in a range of formal and informal contexts, including classroom discussion
- Giving short speeches and presentations, expressing their own ideas and keeping to the point
- Participating in formal debates and structured discussions, summarising and/or building on what has been said.

Mathematics

Pupils should [...] reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

- Can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Science

- Pupils should understand the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity. [...] They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.[...] The social and economic implications of science are important but,

generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science [...]The principal focus of science teaching is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them [...]. Most of the learning about science should be done through the use of first-hand practical experiences and sources, such as books, photographs and videos.

- Pupils should be taught to:
- Identify, name and describe the simple physical properties of a variety of everyday materials
- Compare and group together a variety of everyday materials on the basis of their simple physical properties
- Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food
- Observe and describe how seeds and bulbs grow into mature plants
- Notice that animals, including humans, have offspring which grow into adults
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
- Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing or different materials are used for the same thing. They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials.
- Comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser used, discovering how seeds are formed.
- Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Research and discuss how chemical changes have an impact on our lives [...] and discuss the creative use of new materials such as polymers.
- The production of carbon dioxide by human activity and the impact on climate.

Art and Design

A high-quality art and design education should engage, inspire and challenge pupils, equipping them with the knowledge and skills to experiment, invent and create their own works of art, craft and design. As pupils progress, they should be able to think critically and develop a more rigorous understanding of art and

design. They should also know how art and design both reflect and shape our history
The national curriculum for art and design aims to ensure that all pupils:
- Produce creative work, exploring their ideas and recording their experiences
- Become proficient in drawing, painting, sculpture and other art, craft and design techniques
- To use a range of materials creatively to design and make products

Pupils should be taught to develop their techniques, including their control and their use of materials, with creativity, experimentation and an increasing awareness of different kinds of art, craft and design.

Citizenship

A high-quality citizenship education helps to provide pupils with knowledge, skills and understanding to prepare them to play a full and active part in society. [...] Teaching should equip pupils with the skills and knowledge to explore political and social issues critically, to weigh evidence, debate and make reasoned arguments. It should also prepare pupils to take their place in society as responsible citizens.
The national curriculum for citizenship aims to ensure that all pupils:
- Develop an interest in, and commitment to, participation in volunteering as well as other forms of responsible activity, that they will take with them into adulthood
- Are equipped with the skills to think critically.

Pupils should be taught about:
- The roles played by public institutions and voluntary groups in society, and the ways in which citizens work together to improve their communities, including opportunities to participate in school-based activities
- They should experience and evaluate different ways that citizens can act together to solve problems and contribute to society.

Design and technology
Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world.
The national curriculum for design and technology aims to ensure that all pupils:
- Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- Critique, evaluate and test their ideas and products and the work of others

They should work in a range of relevant contexts (for example, the home and school, gardens and playgrounds, the local community, industry and the wider

environment).
- Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups.
- Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- Use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses
- Investigate new and emerging technologies
- Understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists.

Geography

A high-quality geography education should inspire in pupils a curiosity and fascination about the world [...] and equip them with knowledge about diverse places, people, resources and natural and human environments, together with a deep understanding of the Earth's key physical and human processes.
Pupils should develop knowledge about the world, the United Kingdom and their locality and be taught to:
- Use world maps, atlases and globes to identify the United Kingdom and its countries, as well as the countries, continents and oceans studied at this key stage
- Use aerial photographs and plan perspectives to recognise landmarks and basic human and physical features; devise a simple map; and use and construct basic symbols in a key and should understand how human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems.

The programme

General understanding of the activities

There are several ways to implement these activities which can be developed together or spread throughout the academic year. However, we would recommend the following ideal combinations:

- Full: use of the 8 hours of the programme to analyse sustainability and develop a business plan (Bear's Cave);
- The simplified Bear's Cave: full programme without the Debate and Upcycling (6hrs plus around one hour for the groups to develop their business proposition);
- The Tripod: activities 3 to 5 (3hrs);
- The fun and games: activities from the Green Quiz, the Debate and Upcycling (at least 3hrs – will depend on the upcycling).

Workshop 1. Sustainability, what is the fuss all about?

Time required: c. 50-60 minutes

Teacher's notes
- Read thoroughly the introduction and material provided in the previuos chapters;
- Explanation and introduction to the concept of Circular Economy which is favoured by the United Nations as ideal alternative to sustainable development;
- Consider maybe watching "The true cost" to understand the scenario better.

Learning objectives
- Initial and broad introduction to the subject of the workshop to students;
- Introduction to the tripod and general concepts through a word search;
- Explanation of the competition (which can be adapted as please).

WORKSHOP DESCRIPTION

ACTIVITY 1: Introduction

Time required: 15 minutes
Material provided: Activity annex 1 - Introduction slides 1 (on request).

Activity description
The slides contain a broad explanation of concepts surrounding sustainability which will be sufficient for the word search and which will be explored in-depth during the other activities.

ACTIVITY 2: Sustainability word search

Time required: 15 minutes
Material provided: Word search (Appendix 1, p. 44)

Activity description
The students will be provided a word search with key sustainability concepts. They will have 15 minutes but depending on the student it might not be enough time to finish it. Encourage the pupils to discuss the words and clarify concepts which can be harder to understand such as 'carbon footprint' (please find the answer on the glossary at the end of this booklet).

ACTIVITY 3: The Bear's Cave

Time required: 10 minutes
Material provided:
Slides and the show's Vignette (https://www.youtube.com/watch?v=dclj3xTvmts)

Activity description:
Based on the Dragon's Den TV show the Bear's cave is a competition between business propositions which will be developed by the students either during the full extent of the programme or during the simplified version.
The choice for the bear is due to the animal's strength and at the same time vulnerability to environmental changes.

Competition's rules:

- Divide the class in pairs or groups according to the number of students.

From the time they are divided all the following activities will be done together, as a team. This is important because this programme can be seen as a 6 or 8 days competition and many of the activities will generate points towards the final score and 'prize'.

- The students must use the Circular Economy principles (explained in the next activity) to create a fashion related company which embraces the three main aspects of sustainability: social, economic and environmental.
- They can choose any part of the value or supply chain of the textile industry as long as they remember to have answers for the for the points you you can see in the diagram in following page.
- This will be the closing activity of the programme and will account for 100 points (to be added to the points from the other activities), being judged by teachers or personal available.

ACTIVITY 4: Circular economy

Time required: 10 minutes
Material provided: Circular and linear economy diagrams (Appendix 2, p. 45)

Activity description
After analysing the diagram the students should start thinking about what they will develop for their 'Bear's Cave' businesses and how they could possibly use circular economy.
Remember to leave some time for Q&A

Expected outcome:
From this introduction, students are expected to start evaluating companies surrounding them and how they function, where their production plants are based, if they have a corporate social responsibility or any kind of sustainability department, etc.

Image to support ACTIVITY 3: The Bear's Cave

Workshop 2. Green Quiz

Time required: c. 50-60 minutes

Teacher's notes

- This day is expected to be a fun day in which students start practicing some of their ideas about sustainability and are introduced to other new concepts.
- As said before, the students will be working in teams and will be competing against the other teams for points.

Learning Objectives

- This explicit method of 'layered game' was developed to expose basic sustainability aspects which are already imprinted in most students around the UK, bringing them to use in an affordable, easy and fun manner.

WORKSHOP DESCRIPTION

ACTIVITY 1: Introduction

Time required: 5 minutes
Material provided: Activity annex 2 - Introduction slides 2 (on request).

Activity description

Pulling back from concepts explored on the first day the students (organised into their 'Dragon's Den's groups) will compete for the overall performance in the GREEN QUIZ which is composed of 6 activities to be developed with the following 55 minutes.

ACTIVITY 2: Human Photocopy

Time required: 10 minutes
Material provided: United Nations Sustainable Development Goals (Appendix 3, p. 46)

Activity description

1. Each team will be given one sheet of paper;
2. The image to be photocopied will be placed centrally and equally distant from all the groups;
3. One member of each group will have 30 seconds to see the image and memorise it. Without touching or bringing the image back to the group;
4. Once the 30 seconds are finished this student will return to its team

and draw as much information as he/she can remember during other 30 seconds;

5. Once this time is finished, another member of the team will do the same: look at the image for 30 second and draw for other 30.
6. This alternation will go on for 5 minutes.
7. By the end of the 5 minutes each team will bring their drawing forth to be evaluated. The pointing should be assessed as:
    a.Overall layout: 10 points
    b.Drawings: points each
    c.Writings: points each

ACTIVITY 3: Fast find

Time required: 10 minutes
Material provided: Images by theme (Appendix 4, p. 47)

Activity description

1. Before class the facilitator should distribute the cards around the room.
2. The facilitator should then write on the board (or any visible place) the 3 categories of the cards.
3. The student will have 8 minutes to find and organise the images according to the categories.
4. Each image found and rightly identified is worth 1 point.

ACTIVITY 4: Hot seat

Time required: 10 minutes
Material provided: Production description (Appendix 5, p. 50)

Activity description

1. One student from each team will have 2 minutes to read the description of the production of a product (provided);
2. This student will then have other 2 minutes to explain the process to the team;
3. The team will then have 5 minutes to draw and find the flaws or advantages of the method described;
4. The best and more comprehensive solution wins 5 points.

ACTIVITY 5: Back to Back drawing

Time required: 5 minutes
Material provided: Figures (Appendix 6, p. 55)

Activity description

1. To be developed by one pair of students per team;
2. One student will be the narrator and the other the artist;
3. The students must sit back to back and they will have 2 minutes for the narrator to explain the image and the artist to draw (without asking the narrator for explanations).
4. After that time, the artist will have 1 minute to check with the narrator its doubts.
5. The most accurate drawing wins.

ACTIVITY 6: Quiz (90s to answer)

Time required: 15 minutes
Material provided: Quiz me! (Appendix 7, p. 56)

Activity description

1. The team will be competing against each other;
2. The facilitator can choose how the competition will be done according to the number of students;
3. 100 True or False propositions are provided and each team (or student) are expected to correctly answer as many questions as possible in 90 seconds. The team with more correct answers, wins.

ACTIVITY 7: Plenary

Time required: remaining

Activity description

1. During the plenary the facilitator will count each team's points and write them down to be used in the future activities.

Expected outcome

- Learn varied concepts, objects and practices involved in sustainability through the games in an interactive way.

Workshop 3.
Social Development

Time required: c. 50 - 60 minutes

Teacher's notes

- Student might consider the material strong in some of the videos, hence its implementation through a quiz;
- It's essential to know that raw materials are generally planted or produced in underdeveloped countries and that work condition in these countries can be deplorable due to poor legislation, labour laws and enforcement;
- Labour can be considered the most negative aspect of the textile industry as cheap labour tends to increase profit;
- The supply chain reflects the need for cheaper materials and labour, so consequently the products have to 'travel' longer distance from the production plant to the market.

Learning objectives:

- Introduce the students to the global production environment in which their clothes are inserted;
- Initial understanding of the concept of globalization and the production pipeline's needs;
- Understanding of the lengths a garment might 'travel'.

WORKSHOP DESCRIPTION

ACTIVITY 1: Do you agree or disagree (and why?)

Time required: 5 minutes
Material provided: set of questions (Appendix 8, p. 59)

Activity description

1. The instructor/teacher will start this activity with a set of questions which are intended to facilitate the discussion that will follow
2. The students should decide if they agree, disagree or are unsure
3. The students are then expected to interact and try to change their
4. colleagues' minds defending their point of view
5. Give the students around 5 minutes per topic (also depending on their participation level) and then recount who agrees or disagrees, always trying to motivate them to discuss the topics.

ACTIVITY 2: T-shirt price breakdown

Time required: 5 minutes
Material provided: Sketch of a t-shirt cost break (Appendix 9, p. 60)

Activity description
After answering the 'agree or disagree' questions the students will be separated into their teams and given a t-shirt breakdown chart for discussion about the distribution of the price, ideally comparing the retail margin to the worker's.

ACTIVITY 3: General introduction - videoquiz

Time required: circa 30 minutes
Material provided:

a. Links to open-source videos online:
   - 'The toxic price of leather' Sean Gallagher (https://vimeo.com/88261827)
   - 'Fair Trade: Improving lives' – The Fairtrade Foundation (https://www.youtube.com/watch?v=4tvLHDxv4B4)

b. 2 sets of questions for the quiz (1 per video); (Appendix 10, p. 61)

Activity description
Even though these videos can be considered harsh they portrait very clearly the intrinsic connection between the social aspects of production and the environmental, which tends to be the most recognised consequence of production. Doing this with a quiz guarantees that the students will pay more attention to the content of the video in order to make more points.

ACTIVITY 4: Where do your clothes come from?

Time required: 5 minutes
Material provided: Where your clothes come from maps - Labour, Production, Consumers. (Appendix 11, p. 62) This should also help:

Activity description
Once the students have heard of the critical situations in India, Uganda, etc. It is essential for them to learn where those countries are, giving the facilitator an opportunity to teach some historical events which might have led to this, such as:

1. Colonialism;
2. The crusades and the "discovery of the east";
3. The silk roads;
4. The goods triangle between cotton produced in the USA, manufactured goods from the UK and slaves from African countries;

5. Neo-colonialism;
6. The industrial revolution, and others.

ACTIVITY 5: So what? (solutions for the Dragon's Den)

Time required: 5 minutes

Activity description
After learning more about these issues the teams are going to work together towards their 'Bear's Cave' projects. They are expected to discuss how they will approach social aspects in their projects and how consumers could be involved in the improvement of lives around the world.

Expected outcome:
- Students will understand the association of quality of life, income and the globalised textile industry;
- Initial conceptualisation of how something as simple as clothing can be related to a more complex system;
- Start shaping their project proposition into a possible instrument for change.

Workshop 4.
Environmental development

Time required: As this can be a very hands-on set of activities, it might be wise to distribute them over more than one hour, possibly, 50 to 60 minutes per activity

Teacher's notes

- This is a very 'hand-on' class so depending on the number of students it might be the case to do a demonstration class, leaving more time for the paper recycling activity which is easy for pupils from a varied range of ages.

Resources

- Step by step description of how to recycle paper:
- List of possible alternative for things found in the waste (this activity could either be carried out by the facilitator, seeking to engage the students as much as possible, or by the students with the due attention to possible hazard);
- Thick gloves and tarp for the waste bins' analysis (not provided).

Learning objectives

- Understand how simple sustainability processes happen and how students could possibly replicate them at home;
- Show in a very 'shocking' way how things could be reprocessed if they don't get thrown on regular garbage.

WORKSHOP DESCRIPTION

ACTIVITY 1: Intro

Time required: 5 minutes circa
Material provided: Activity annex 3 - Introduction slides 3 (on request).

Activity description
Environmental development focusses on concepts to which students are usually aware of and might carry them out on a daily basis.

ACTIVITY 2: Waste audit

Time required: up to 20-25 minutes
Material required: thick gloves, tarp, one of the school's trash bins and the provided extra material (Appendix 12, p. 71)

- Activity description: the facilitator will (using the due safety gear) empty one of the school's general waste bin on the tarp. The activity relies on examining the contents and make divide the waste in different material categories (such as

paper, plastic, cartons, cans, etc). After defining all the waste that could have been recycled in the proper recycling bin, the teacher will ask the students to come up (in groups) with alternative ends to the materials removed from the bins. The facilitator will be provided with an extensive list of alternative ends to a wide range of waste, this way, students will be introduced to different alternatives than the most used.

ACTIVITY 2: Paper recycling

Time required: 50-60 minutes
Material provided: How to recycle paper (Appendix 13, p. 76)

Activity description

The facilitator and students should follow the instructions from the card, using paper found in the classroom's scrap paper tray.
Student can also use materials for decoration (such as seeds, dried leaves or flowers, glitters).
The facilitator has to discuss about the 3Rs, Reduce, Reuse, Recycle.
These are the key points of the discussion with the students:
1- The facilitator should ask the students where does the paper come from and what needs to be made. The discussion should be about reducing the amout of tree cut to produce paper and cardboard.
1- Motivate the students to **Reduce** their waste: "Do I really need to use a sheet of paper/do I really need to print a document or can I read it from my laptop?"
2- If they really need to use some paper, the facilitator should motivate them to **Reuse** that paper, telling the students to always put the paper in the classroom's scrap paper tray in order to write on the opposite side.
3- When the paper is written on both sides, students can throw it in the paper recycling bin in order to make new paper and avoiding to cut more trees.
4- The facilitator should them motivate the students to buy recycled paper, otherwise if no one buys recycled paper, there is no point in doing it.
The facilitator should tell the student that they can recognize recycled paper by findind on the paper the logo below.

Expected outcome

- Students are expected to interact differently with waste and see it as an input to something else than the landfill; they should also remember well the 3Rs whenever they use or buy something with the grownups.
- To give students a different perspective this workshop emphasises changes students could do to improve their carbon footprint.

Workshop 5.
Economic development

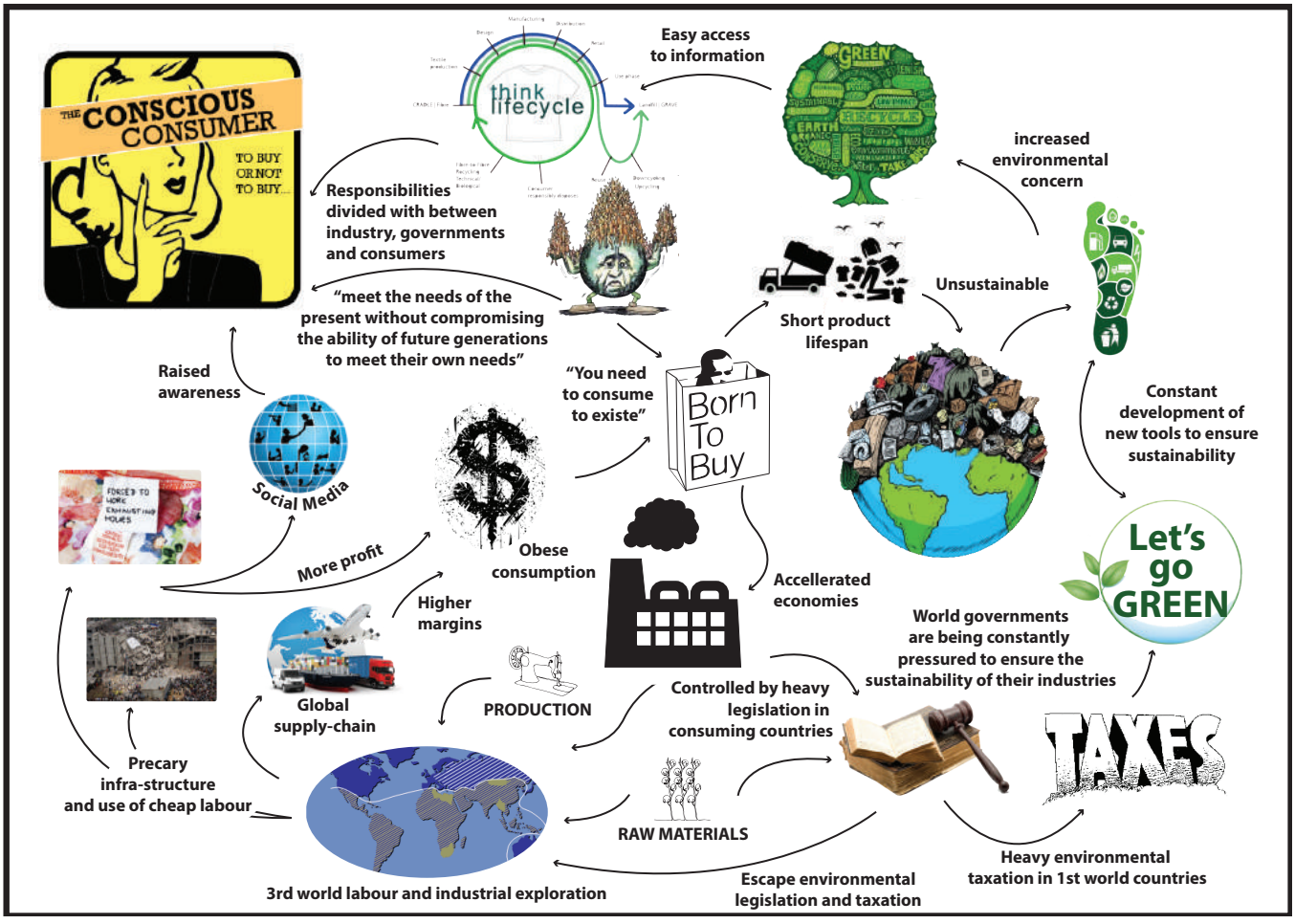
Time required: c. 60 minutes

Teacher's notes

- The economic aspects of sustainability are one of the most complicated factors to be understood as it tends to be secondary to most people. The general idea behind it is that sustainable development cannot rely on economic disparity.
- In order to achieve an universal improvement the wealth needs to be spread.
- In simple terms: It is much harder to think about cleaning industrial waste when the population can barely feed itself.
- In order to explain this we decided to develop mind maps like the one bellow:

Learning objectives

- Understand the importance of economic development;
- Educate about the extensions of pollution within a developed and underdeveloped community.



WORKSHOP DESCRIPTION

- Students will be provided with backup information for two case studies and they should analyse (Appendix 14, p. 78):
    1. How the cases describe being fair;
    2. How the cases portray their profits;
    3. How do the companies satisfy their customer's demands?
- Once these points are analysed the students are expected to develop an idealised map in which they evaluate (locally and globally) the benefits from each company.
- Once done so, they can discuss how to improve those points on their Bear's Cave proposal.

Expected outcome

- Even though this activity might be considered too advanced for some students, the idea here is mainly: how can a company profit, be fair and satisfy their customer's demands at the same time;
- If deemed too complicated, students can also go through the global citizenship slides to analyse the differences between countries in regards to development and sustainability. Trying to answer the following questions:
    1. Why is it harder for underdeveloped countries to impose stricter labour and environmental legislations?
    2. The Kyoto protocol also evaluates the differences in development when considering each country's emissions. This way, countries that started developing their industries later have space to grow. Do you think this measure is adequate?

Workshop 6. Debate

Time required: c. 60 minutes

Teacher's notes

- In this case it might be good to read all the debate cards in order to understand the topic or maybe research points you might not be too clear about.

Material provided: debate cards (Appendix 15, p. 82)

Learning objectives

- Argue a point of view, even if you disagree with it.

Activity description

- Attached to this guide there are 6 different topic propositions, depending on the size of the group one or more topics should be chosen;
- Students should be divided between 'For', 'Against' and judges;
- Students should read the cards and think about how the issues on the card can motivate their discussion.
- Instigate discussion to motivate them to think about the sentences and ideas proposed on the card.
- Student will then have 10 to 15 minutes to create an argument to be presented to the judges.
- As in any other debate there should be time for both participants to present their case, be cross-examined and rebut. Finally being evaluated by the judges.

Expected outcome

- Depending on the student's year it is important (and a part of the curriculum) that they clearly understand the concept behind arguing their point of view. This activity is key to ensure they understood the concepts studied thus far and to motivate them to discuss and develop an argument wisely.
- Besides making the students discuss and defend their 'actor's' point of view, the students will hear the other perspectives;

Workshop 7. Upcycling

Time required: c. 60 minutes

Teacher's notes

- This very hands-on activity is another attempt to motivate students to generate goods of materials considered waste;
- This should be advertised before the workshop to ensure students bring material from home, such as old clothes, toilet and kitchen rolls, etc;
- Please beware of possible threats like needles.

Learning objectives

- Learn how to deal with waste in a sustainable and fun manner.

Activity description

This guide provides (Appendix 16, p. 90) different ways to produce the following:

- Toilet roll mobile holder;
- Jeans utility belt;
- Water filter;
- Mobile speakers;
- Notebook cover;
- Necklaces made of t-shirts;
- Pencil cases;
- T-shirt carrier bag;
- Sweater pet bed;
- Glasses case.

All the material and steps are provided on each upcycling cards, but feel free to search for more activities.

Expected outcome:

Once more students are expected to be creative and provide an alternative end to the simple materials, easily found at home.

Workshop 8.
The Bear's cave - Final

Time required: c. 50 - 60 minutes

Teacher's notes

- There is a cycle of different levels of pressure towards higher profits as well as towards sustainability. In order to satisfy all the actors this forces should be able to balance each other.
- This final activity is targeted at evaluating how the students absorbed the information from the previous workshops and used it towards their own business proposition.

Resources

- In the appendix 17 (p. 103) there are three cards to help on the assessment: a Gantt chart to understand the level of organisation the students achieved, a scorecard with the essential information they should provide, and a project charter for clearer understanding of the whole picture.

Learning objectives

- This activity was developed to evaluate the programme as a whole with all its activities and to observe how the students adapted to the concepts and incorporated them into their business and daily perceptions.

Activity description

- Each group will be given 10 minutes to present their business plan.
- The judging panel will have 5 minutes for questions and answers, followed by 5 minutes of questions and answers from their colleagues.
- After all groups presented the judges will have about 10 minutes to compare propositions and chose the most adequate regarding: chances of success, coherence, sustainable impact, etc.

Expected outcome

- After the full workshops students are expected to have a broader and more useful understanding of sustainability, distancing it from only recycling. The students are also expected to improve their understanding of how they can improve their behaviour as well as that from their friends and family.
- If interested in more activities, please see extension activities bellow.

EXTENSION ACTIVITIES

1) Cards FOR Humanity

About the cards

'Cards FOR humanities' is part of the educational programme "The tripod of sustainability" developed as part of Natalia Moreira's PhD at the School of Materials – University of Manchester (UK). Endorsed by Reading International Solidarity Centre (RISC), The Network of Science, Technology, Engineering and Maths (STEMNet), CORE – Creative Outreach for Resource Efficiency and the University of Manchester outreach team this game is an attempt to encourage children (and adults) to learn through mainstream games. The cards were inspired by the popular satirical 'Cards against Humanity' game developed by Josh Dillon, Daniel Dranove, Eli Halpern, Ben Hantoot, David Munk, David Pinsof, Max Temkin, Eliot Weinstein.

It was developed by Natalia Moreira, Francesca Arato, and Kathryn Downey, and assisted by Lara Garett and Mobeen Khan. The game contains 130 dark green cards and 650 light green cards.

CARDS FOR HUMANITY

the game for sustainable people

Basic rules

To start the game, every player draws 10 cards.

The person who most recently recycled something starts as the Environmental Ruler and plays a dark green card. The Environmental Ruler reads out loud the question (or phrase) on the card, emphasising how many cards are needed to fill the card.

All the players must then select one (or two) of the cards on their deck which they believe to be either the funniest or most correct to answer the question or fill in the blanks. They should then pass the card(s), facing down, to the Environmental Ruler.

The Environmental Ruler should then shuffle the cards and share each card combination with the group. The Environmental Ruler will then choose his favourite answer and its owner wins the dark card (which symbolises one point).

After the round every player gets enough light cards to have 10 on the deck again and the winner becomes the Environmental Ruler. Starting the next round of the game.

Never have I ever: at any time, players may discard cards they don't understand. If another player knows what it means they get 3 points . If however, someone gives the wrong explanation, he/she loses 5 points.

Alternative rules

Green McGreeny: for every round the players draw a random light card for an imaginary player called Green McGreeny. If he wins every player gets a free point.

Rebooting the universe: at any time the players can exchange a Dark card from its winning deck by as many white cards as the player want (always having a maximum of 10 light cards).

Increased threat: every time the players are given a card with two spaces they can choose to draw another card to increase their chances of success.

Equal rights: instead of having an Environmental Ruler the winner is voted democratically (every player can vote their favourite to win the round).

Footprint assessment (for bigger groups): instead of choose ONE favourite combination, the Environmental Ruler ranks the three best combinations. The first get 3 point, the second 2 and the third 1. Once you decide to finish the game the winner will be the one with more points.

Ending the Game

Once you have decided it's time to call it a day, you can create a song using 5 different cards. This round is worth 5 points and the group as a whole must vote their favourite combination!

3) Quiz me!

About the cards

'Quiz Me!' is part of the educational programme "The tripod of sustainability" developed as part of Natalia Moreira's PhD at the School of Materials – University of Manchester (UK). Endorsed by Reading International Solidarity Centre (RISC), The Network of Science, Technology, Engineering and Maths (STEMNet), CORE – Creative Outreach for Resource Efficiency and the University of Manchester outreach team this game is an attempt to encourage children (and adults) to learn through mainstream games.

The board was developed to reflect sustainability concepts and contains 57 stops to represent the reduction of greenhouse gas emissions agreement done in 2008 by the G7 (the seven richest countries in the world at the time). The agreement promised to reduce emissions by half by 2050, which also is the year predicted by the United Nations Environment Director, Achim Steiner, to be when humanity will face "a global collapse of all species being fished, if fishing continues at its current pace ".

It was developed by Natalia Moreira, Francesca Arato and Kathryn Downey, and assisted by Lara Garett and Mobeen Khan. The game contains 100 multiple answer questions, 100 true or false statements, 100 knowledge cards, a roulette to be used in the challenge mode and a board for the standard game.

Basic rules

To start the game all players roll the dice. The one with the highest number starts and the game moves clockwise from this person.

The first player will then roll the dice and move its piece in accordance to the number shown. The path on the board has three different colours: yellow, green and blue; and each represent one type of card. The yellow cards have multiple answer questions on them, greens true or false, and blue knowledge cards.

Depending on where the piece fell the player will have to draw the equivalent card and answer the question (in case it is yellow or green), if correct, the player wins a point and can play once more, then passing the dice to the next player; on the other hand, if the player answers wrongly, the game moves on.

If however, the card is blue, all the players join in to 'test their knowledge'. The blue cards request categories to be listed, so, in this case, the point goes to the player with most correct answers.

Once all players are used to the game, it is possible to adapt the losing rule to losing a point. So, every time a player wrongly answers a question, they lose a point.

Alternative format – CHALLENGE

For the challenge format the players should use the roulette and not the board.

The players should be divided into teams of similar sizes, and they will be competing against each other.

For every round one player will roll the roulette which has 3 options (yellow, green and blue – all related to the cards described above). One of the team members (not participating in this round – the judge) will read the correspondent card out loud for all the players, who will then have 30 seconds to respond yellow and green cards, and 60 seconds for blue cards.

The "judge" will then read the correct answer and the players should add one point for correct answers, and nothing for wrong answers. In the case of knowledge cards, only the player with most correct answers can get the point.

Ending the game

Once all the fun is done, the players should count their points. The player with the highest score wins.

3) Textile Quiz me!

Basic rules

To start the game all players roll the dice. The one with the highest number starts and the game moves clockwise from this person.

The first player will then roll the dice and move its piece in accordance to the number shown. The path on the board has three different colours: yellow, green and blue; and each represent one type of card. The yellow cards have multiple answer questions on them, greens true or false, and blue knowledge cards.

Depending on where the piece fell the player will have to draw the equivalent card and answer the question (in case it is yellow or green), if correct, the player wins a point and can play once more, then passing the dice to the next player; on the other hand, if the player answers wrongly, the game moves on.

If however, the card is blue, all the players join in to 'test their knowledge'. The blue cards request categories to be listed, so, in this case, the point goes to the player with most correct answers.

Once all players are used to the game, it is possible to adapt the losing rule to losing a point. So, every time a player wrongly answers a question, they lose a point.

About the cards

'Quiz Me!' is part of the educational programme "The tripod of sustainability" developed as part of Natalia Moreira's PhD at the School of Materials – University of Manchester (UK). Endorsed by Reading International Solidarity Centre (RISC), The Network of Science, Technology, Engineering and Maths (STEMNet), CORE – Creative Outreach for Resource Efficiency and the University of Manchester outreach team this game is an attempt to encourage children (and adults) to learn through mainstream games.

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It was developed by Natalia Moreira, Francesca Arato and Kathryn Downey, and assisted by Lara Garett and Mobeen Khan. The game contains 100 multiple answer questions, 100 true or false statements, 100 knowledge cards, a roulette to be used in the challenge mode and a board for the standard game.

GREATER MANCHESTER HIGHER

MUSEUM OF SCIENCE & INDUSTRY

MANCHESTER 1824
The University of Manchester

Material Girls

Rules

•To begin, shuffle all the cards, keeping them face down. Hand each student one card.
•To decide which of the pair will dictate the category, students can play rock-paper-scissors.
•The winner selects a strong category from their card (e.g. melting point). This player then challenges their opponent in this category.
•The challenged player will then read out the same category on their card.
•The player with the best or highest value wins. In a tournament, they go through to the next round. If it's a regular face-off, the winner takes their opponent's card, and puts this, with their own, to the bottom of their pile. The winner of this contest is the player with all the cards.

Rules (cont.)

• If both players share the same value, hand out two new cards. The challenged player can now decide on the category. Play again, whoever wins takes all the cards on the table!
• After each round, the students can briefly discuss the properties of the materials on the cards. Challenge them to quickly create an imaginary product that uses both materials combined, utilising on one property of each.

About the cards

All materials are different. They have different properties, structures and appearances.

It's these qualities that make them ideal for different uses, and if we combine them, we can create applications for almost every problem.

In a twist on the classic Top Trumps® card game, we'll explore these ideas aiming to portray the alternative material applications and their potential in the world around us.

By pitting materials against each other, we'll look at properties such as strength and melting point, and discuss where materials can be combined and improved.

About us

The Materials Girls is a group of PhD researchers based in the University of Manchester, at the School of Materials:

Eleanor Trimble
Meera Dulabh
Natalie Ishmael
Kathryn Downey
Natalia Moreira
Sobia Khan

All of the team members have a degree in textiles, but the range of expertise and research interest varies considerably from medical applications to 3D knitting techniques, neuro-marketing and sustainability. By combining and expanding these profiles the team was able to create an interesting combination towards the development of this activity.

Acknowledgments

The team would like to acknowledge the developers of the Manchester Master Materials - version 2.5 (developed by Dr. Sarah Haigh and her team) for serving as an inspiration for this project, along with the MOSI and University of Manchester Outreach teams for their support and patience during the development of these cards.

We would also like to thank our research sponsors: The Engineering and Physical Sciences Research Council (EPSRC) and the Brazilian Ministry of Education (CAPES).

EPSRC
Engineering and Physical Sciences Research Council

BRASIL

What does a Textile Scientist do?

How strong is a material? What can it be used for? Why was my blazer made of polyester instead of cotton? How easy is it to choose the colours of my clothes? What material is better for the environment? – These are common question answered by textile scientists.

Developing insulation, creating artificial blood arteries and everyday clothing are parts of the Textile Scientist's area of expertise. Ranging from Fashion design to business or technology this line of science can have one of the most eclectic professional outcomes.

What does a Textile Scientist do? (cont.)

Emphasising that textiles are NOT just used for clothing can be rather hard when the first thing that people think of is the clothes that they wear.

With a strong focus on innovation the textile scientist can develop wearable technology to assist heart function; alternative materials to create comfortable treatments to spinal conditions; fibres and composites to improve aircraft and automotive performance; as well as your everyday clothes, considering better and more breathable materials for sports or stronger school uniforms (so you can play more without being told off for ripping them!).

5) List of Slides (to be provided on request)

- Introduction to the programme
- The Bear's Cave competition
- Circular economy
- Introduction to the Green Quiz
- Introduction to Social Development

6) Relevant Movies

1) An inconvenient Truth - 2006
2) Erin Brockovich – 2000
3) Food, Inc. – 2008
4) Wall-E – 2008
5) The 11th Hour – 2007
6) Plastic Planet – 2009
7) Bambi - 1942
8) Rio - 2011
9) Over the Hedge - 2006
10) March of the Penguins – 2005
11) Fly away home – 1996 (focus on how a child can make a big difference)
12) Disneynature: Earth – 2009
13) Happy Feet – 2006
14) Isle of Flowers – 1989
15) Silent Running - 1972

7) Relevant references

- An inconventional Truth: The Planetary Emergency of Global Warming and What We Can Do About It (2006), by Al Gore
- Cradle-to-cradle: remaking the way we make things (2002), by William McDonough and Michael Braungart
- Just Good Business: The Strategic Guide to Aligning Corporate Responsibility and Brand (2008), by Kellie McElhaney.
- Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create Value and Build Competitive Advantage (2006) by Daniel Esty and Andrew Winston.
- The Truth About Green Business (2009), by Gil Friend.
- Our Choice: A Plan to Solve the Climate Crisis (2009) by Al Gore
- Beautiful and Abundant (2010), by Bryan Welch.
- Empire of cotton : a global history (2014), by Beckert, S.
- Toxic threads: putting Pollution on Parade How textile hiding their toxic trail (2012), Brigden, K., Casper, K., Cobbing, M., Crawford, T., et al.
- Toxic Threads: The Big Fashion (2012), Brigden, K., Casper, K., Cobbing, M. & Crawford, T.
- The silk roads : a new history of the world (2015), Frankopan, P.
- Silent Spring (1962), by Rachel Carson.
- The Ecology of Commerce: a declaration of sustainability (1993), by Paul Hawken.
- This changes everything: Capitalism vs The Climate (2014), Naomi Klein.
- The Story of Stuff: How Our Obsession with Stuff is Trashing the Planet, Our Communities, and our Health—and a Vision for Change (2010), Annie Leonard.

GLOSSARY

Agriculture: the practice of farming, including the preparation of soil for growing crops and the rearing of animals to provide food, wool and other products.

Aluminium: a low density metal that is lightweight and has a thin layer of oxide on the surface that stops air and water getting to the metal, therefore resisting corrosion. Used in aircraft, trains, overhead cables and cooking foil.

Carbon footprint: an increasing quantity measuring the impact of a product, service, activity, company, individual or other entity has on the environment. This is in terms of the amount of greenhouse gases produced and measured in units of carbon dioxide. These impacts usually result from energy consumption, pollution, and other sources.

Compost: a waste management process that creates an ideal environment for decay by layering organic wastes like food scraps and grass clippings.

Circular economy: aims at keeping resources in use for as long as possible to get the maximum value from them whilst in in use, then recover and reuse products and materials at the end of their life.

Climate change: Change of climate, which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods

Colonialism: the practice of taking either full or partial control over another country, occupying it with settlers and exploiting their money or resources.

Conservation: the management of human use of organisms or ecosystems to ensure that such use is sustainable

Consumers: people who use up or expend goods, such as food, electronics, textiles and other products.

Decompose: to break down into component parts or basic elements; to rot. Decomposition is an organic process necessary for the continuation of life since it makes essential nutrients available for use by plants and animals.

Disposable: usually made for one-time use, or limited usage before disposal. (e.g., disposable paper cups, diapers)

Diversity: showing a great range of difference.

Ecolabel: is a label which identifies overall environmental performance of a product or service within a specific category. It is a voluntary labelling method.

Ecosystem: a community of organisms and their physical environment.

Empathy: the ability to understand and share feelings of someone else.

Environment: the immediate surroundings in which people live, or the natural world such as the land, air or water.

Fair trade: A certification scheme that evaluates the economic, social and environmental impacts of the production and trade of agricultural products, in particular: coffee, sugar, tea, chocolate, and others. Fair Trade principles include: fair prices, fair labour conditions, direct trade, democratic and transparent organizations, community development and environmental sustainability.

Labour: a way to describe work.

Landfill: a site for the controlled burial of solid waste.

Litter: waste materials discarded in an inappropriate place.

Manufacturing: the making of something on a large scale using machinery.

Neo- colonialism: the use of economic, political, cultural or other pressures to control or influence other countries.

Overconsumption: is where resource use has outpaced the sustainable capacity of our eco-system.

Pollution: harmful substance deposited in the environment which has harmful or poisonous effects

Recycle: the collection and reprocessing of manufactured materials for remanufacture, either in the same form or as part of a different product.

Recycled: to have been passed again through a series of changes or treatments in order to regain material for human use.

Renewable resources: this is a resource which can be used repeatedly because it is replaced naturally for example, oxygen or fresh water.

Supply chain: the sequence of processes involved in the production and

distribution of something we think is useful.
Sustainability: use of resources, in an environmentally responsible, socially fair and economically viable manner, so that by meeting current usage needs, the possibility of its use by future generations is not compromised

Sweatshops: a factory or workshop especially in the clothing industry where manual workers are employed at very low wages for very long hours under poor conditions.

Toxins: a poisonous substance that is usually very unstable, or harmful when introduced into human, animal or plant tissue.

Upcycle: reuse things that have been thrown away or are unwanted in such a way to create something that is of higher value or quality than the original.

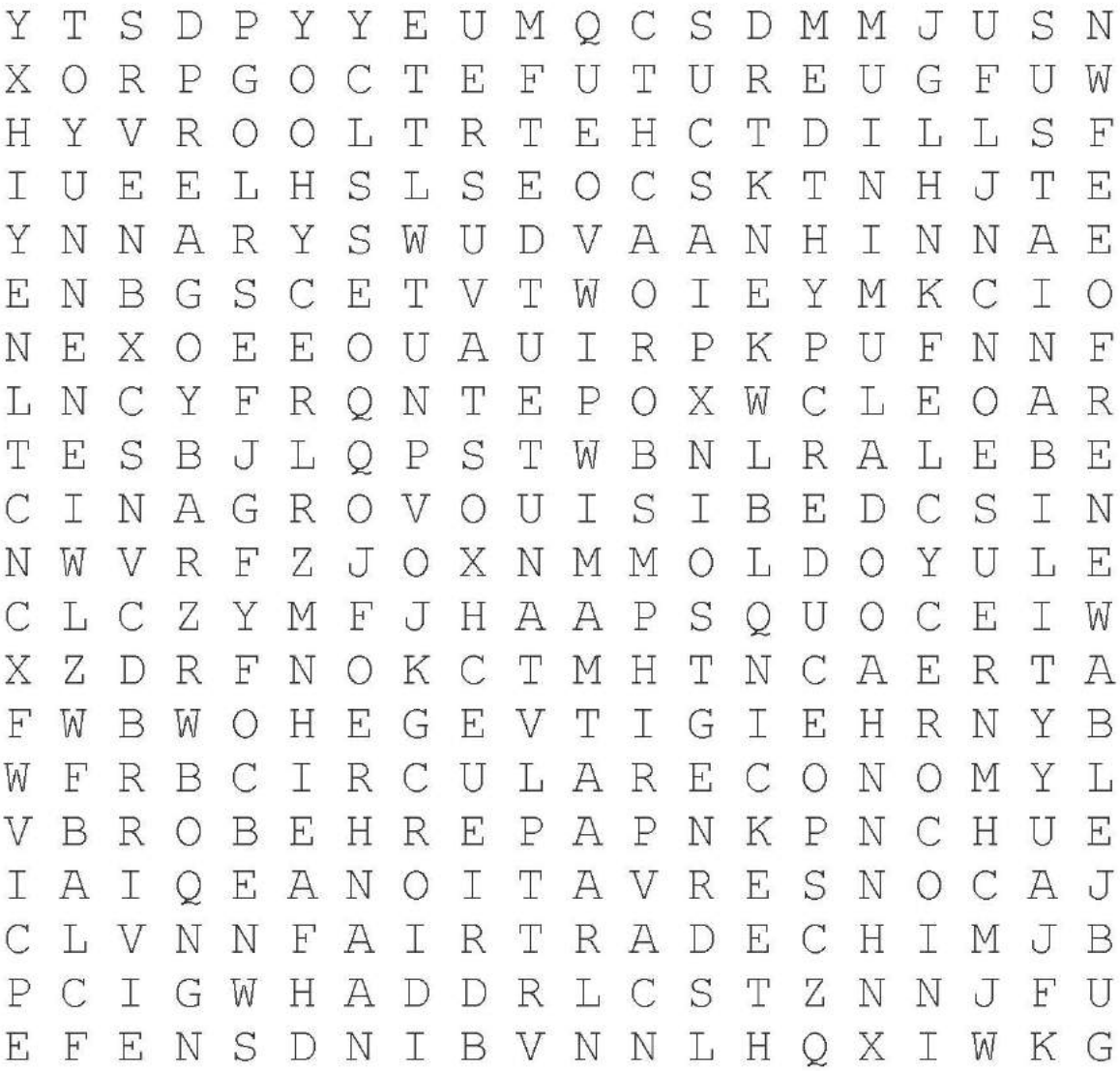
United Nations: is an organisation of countries governments that promote corporation between all the members.

Waste: anything discarded, rejected, abandoned, or otherwise released into the environment in a manner (or quantity) that could have an impact on that environment.

Wastewater: Used water, typically discharged into the sewage system and often contains matter and bacteria in solution or suspension

APPENDIX

APPENDIX 1 WORD SEARCH



Y T S D P Y Y E U M Q C S D M M J U S N
X O R P G O C T E F U T U R E U G F U W
H Y V R O O L T R T E H C T D I L L S F
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Y N N A R Y S W U D V A A N H I N N A E
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N W V R F Z J O X N M M O L D O Y U L E
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X Z D R F N O K C T M H T N C A E R T A
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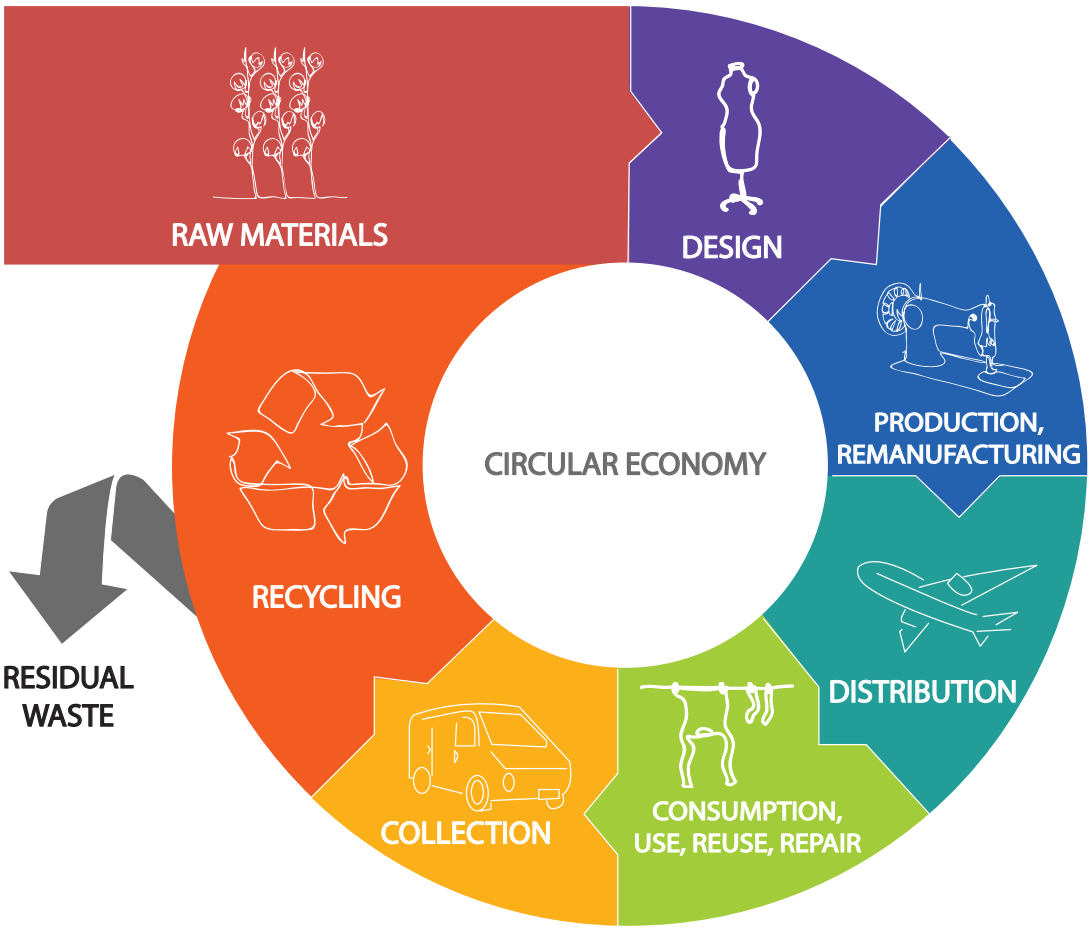
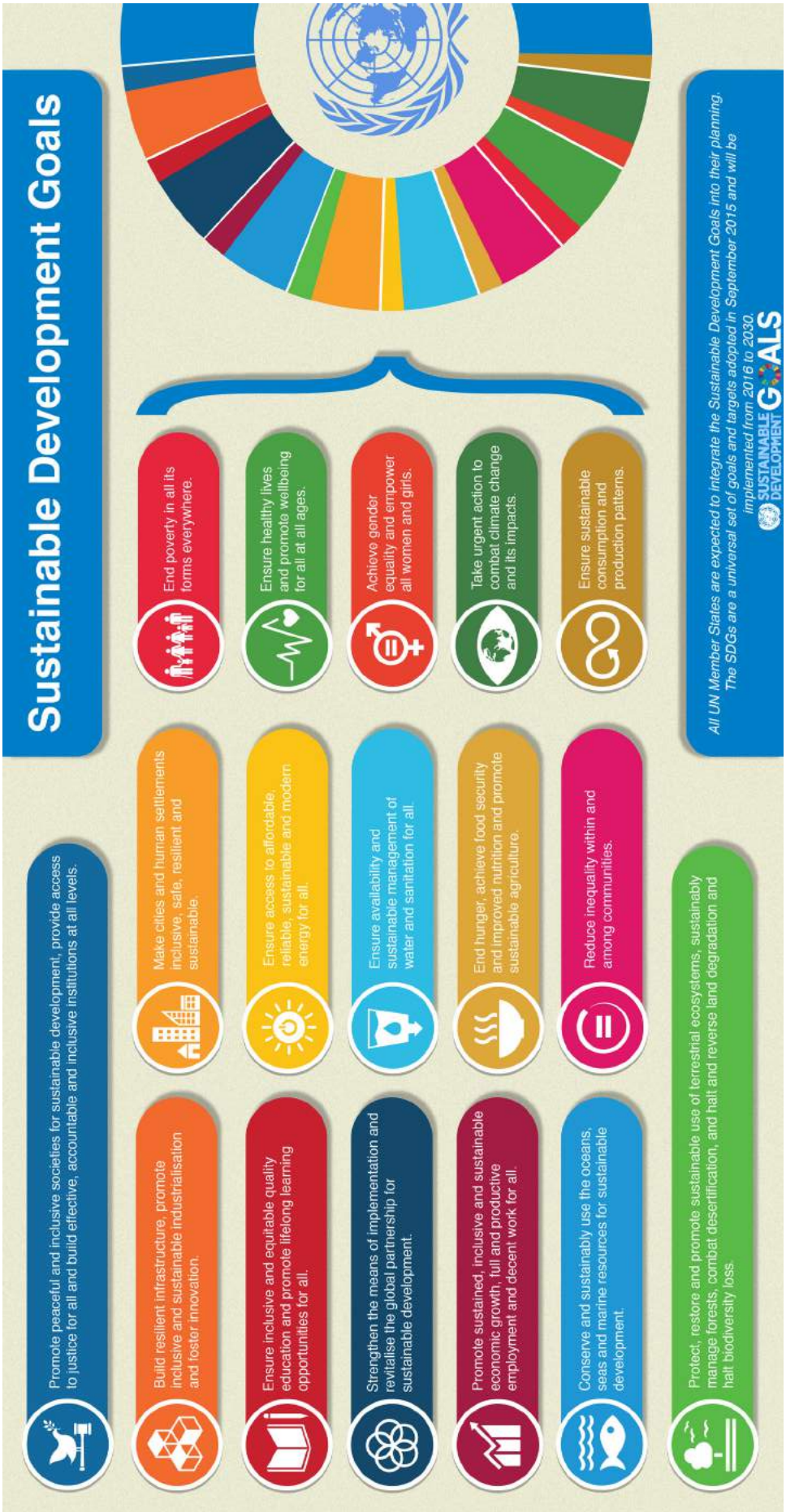
P C I G W H A D D R L C S T Z N N J F U
E F E N S D N I B V N N L H Q X I W K G

- ALUMINIUM
- CARBONFOOTPRINT
- CIRCULARECONOMY
- CLIMATECHANGE
- CONSERVATION
- ECOLABEL
- ECOSYSTEM
- ENERGY
- FAIRTRADE
- FUTURE
- GREEN
- HUNGER
- ORGANIC
- OVERCONSUMPTION
- PAPER
- PEACE
- POLLUTION
- POVERTY
- RECYCLE
- REDUCE
- RENEWABLE
- REUSE
- SUSTAINABILITY
- SWEATSHOPS
- WASTE


LINEAR ECONOMY
Take
Make
Waste
Materials
Product
End of Life


RAW MATERIALS
DESIGN
PRODUCTION, REMANUFACTURING
DISTRIBUTION
CONSUMPTION, USE, REUSE, REPAIR
COLLECTION
RECYCLING
RESIDUAL WASTE
CIRCULAR ECONOMY

APPENDIX 3 IMAGE FOR THE 'HUMAN PHOTOCOPY'



UPCYCLING

TRANSPORT















ENERGY CREATION















Production process for a bicycle

The most important part of the product is the diamond-shaped frame, which links the components together in the proper geometric configuration. The frame provides strength and rigidity to the product and largely determines the handling of the product. The frame consists of the front and rear triangles, the front really forming more of a quadrilateral of four tubes: the top, seat, down, and head tubes. The rear triangle consists of the chainstays, seatstays, and rear wheel dropouts. Attached to the head tube at the front of the frame are the fork and steering tube The first step to create this product is to tailor its tubes. The metal is annealed or softened by heating and hollowed out to form hollows or blooms. These are heated again, pickled in acid to remove scale and lubricated. The hallows are measured, cut and precision mitered to the appropriate dimensions. Next the hallows are fitted over a mandrel or rod attached to a draw bench. To achieve the right gauge, the hallows pass through dies which stretch them into thinner and longer tubes, a process called cold drawing.

Next is the Brazing, welding and gluing stage to make this product. Tubes can be joined into a frame either by hand or machine. Brazing is essentially wielding at a temperature of about 871 degrees or lower. The brazing filler is applied and as it melts, it flows around the joint, sealing it. Then comes the aligning and cleaning stage where the assembled frames are placed into jigs and checked for proper alignment. Finishing is the next step where the frames are painted for appearance and to also protect the frame. Chrome plating may also be used instead of paint on components such as the fork blades. Next comes the derailleurs and gear shift levers. Depending on the style of the product the gear shift levers are mounted either on the down tube, on the stem or on the handlebar ends.

Handlebars may be raised, flat or dropped. They are bolted to the bicycle stem which is then fitted into the head tube. Then the brakes are added. The brakes levers are mounted to the handlebars. Seat posts are generally steel or aluminium alloy and are bolted or clamped into position. Wheels are attached to the product frame by means of an axle which runs through the hub of the wheel. Once all these components have been added then the product is ready.

The making of a plastic bottle

Step 1: Polyethylene terephthalate commonly abbreviated to PET is a thermoplastic polymer that can be opaque or transparent depending on its material composition. As with most polymers, PET is produced from petroleum hydrocarbons, through a reaction between ethylene glycol and terephthalic acid. To produce a plastic bottle the PET is first polymerised to create long molecular chains.
Step 2: The first stage in the manufacture of the plastic bottle is to stretch blow mould. The PET is heated and placed in a mould where it assumes the shape of a long thin tube. This is where the polymer PET is forced into a mould known as injection moulding.
Step 3: The tube of polymer known as a parison is then transferred to a second mould. A thin steel rod, called a mandrel is slid inside the parison where it fills the parison with highly pressurised air. The parison inflates to the shape of the plastic bottle.
Step 4: To ensure the bottom of the bottle remains flat, a separate piece of polymer is simultaneously joined to the bottle during blow moulding. The mould must be cooled relatively quickly to allow the newly formed bottle shape to set properly. There are several cooling methods, both direct and indirect which can effectively cool the mould and the plastic bottle.
Step 5: Once the bottle has cooled and set it can be removed from the mould. If a continuous moulding process has been used, the bottles will need to be separated by trimming excess plastic from in between them. If a non-continuous process has been used, sometimes excess plastic can seep through the mould during manufacturing and will require trimming. After removing the plastic bottle from the mould and excess plastic the bottle is ready for transportation.

The making of a scarf

Step 1: Spinning is a preliminary step in the manufacturing of a scarf to produce a continuous form from different fibres. The spinning can be done either by hand or a machine.
Step 2: The next step is weaving in which the quality of the weave differs depending on the nature of the product to be produced.
Weaving is three actions:

- Shedding
- Picking
- Beating –up or battening

Weaving is entwining two yarns known as warp or ends (which run parallel to the weaving machine known as a loom) and weft or filling yarn (which run perpendicular to the loom) to produce fabric.
Step 3: The next step is the manual process of dying also known as coloration. If only natural dyes are used the scarf will be more eco-friendly. The quality of the scarf can be affected by how well the scarf is dyed therefore only experienced workers are used. Dying is done at a temperature just below boiling point for nearly an hour. This process is done for fibre, yarn and fabric.
Step 4: The next step for the fabric may be printed onto. The two common methods used are screen printing or digital printing. Fabrics are often printed with colour, designs and patterns using a multiplicity of techniques and machine types by direct or resist approaches.
Step 5: The final step is washing and finishing, Finishing encompasses chemical or mechanical treatments performed on fibre, yarn or fabric to improve appearance, texture of performance. Some of the finishing methods for the product are brushing, shearing, pressing, raising, beetling, calendaring and folding. Finishing can be carried out in 3 stages for example pre-treatment, colouration and finishing. Washing and finishing upholds the following stages: head-setting, brushing and napping, softening, optical finishing and compacting,

The making of a T-shirt

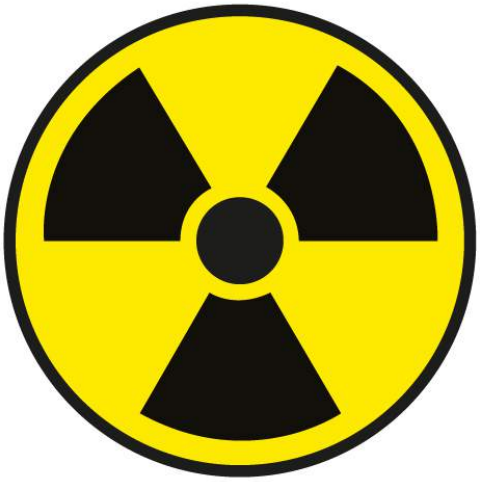
Step 1: Cotton is taken from the field to the cleaning machine where the fibres are combed to get rid of seeds and unwanted materials.
Step 2: The cotton balls are put into a gin where the usable cotton is mechanically separated from the seeds and chaff. Modern cotton gins use multiple powered cleaning cylinders and saws which lead to higher productivity and less labour intensive work than previous methods required.
Step 3: Bales of cotton fibres are spun where they are carded, combed and blended. Before the carding stage which involves separating the fibres into loose strands, the cotton is taken off a picking machine. This spun cotton is then loom knitted into a rough greyish fabric.
Step 4: The next step is wet processing which is where the fabric is treated with heat and chemicals which affects the materials finish, handle and appearance. Examples include bleaching, printing and dyeing. At this stage the fabric goes through inspection for grey textile. This process is typically divided into three separate stages of preparation, colouration and finishing. Fabrics are finished to the desired softness and colouring.
Step 5: The next step is printing where pantone colours, sizing placement and ink type are all confirmed. Each colour in the artwork is separated out and printed onto a clear film. This is called a film positive. The films are used to expose the image onto mesh screens that have a photo sensitive emulsion. Each screen is exposed on a vacuum sealed UV light table. The screens are rinsed with water with an inspection of the artwork for printing.
Step 6: In the last step the t-shirts are sorted and placed into an inventory where orders can be placed and shipped to their new destination.
A brief summary for the production process for the product would be:

- Cotton cultivate
- Harvesting cotton
- Carding, spinning and weaving
- Dyeing, washing and rinsing
- Transportation
- Packaging and marketing
- Retail store and finally consume!

The making of leather

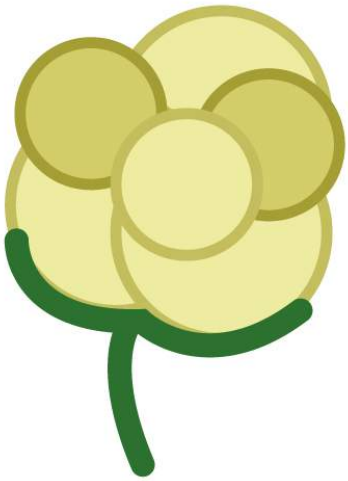
Step 1: Soak the hide or skin of the animal. Once cured it is then soaked in water for several hours or days. The water and surfactants help to remove salt, dirt, debris and any excess material. It also rehydrates the material. (subcutaneous material?)
Step 2: Liming is used to loosen the fibres allowing the material to absorb chemicals that will be used later in the tanning process. Limed hides appear swollen and with this increased thickness can be easily split into two or more layers. The hide or skin can be separated using a splitting machine where the limed hide/skin is pushed by two cylinders against a band blade which cuts it into two layers parallel to its surface.
Step 3: The next step is de-liming where alkali substances are removed from the pelt using slightly acidic chemicals.
Step 4: The next step is bating which eliminates residues of other substances and loosen the fibres of the pelt in order to smooth the grain and achieve a soft and flexible material. Degreasing is carried out to remove and reduce the natural fatty acids from the underside of the skin/hide which could lead to difficulties in the absorption of chemicals.
Step 5: The next step is tanning which converts the protein of the skin/hide into a stable material which will not decay. It is suitable for a wide variety of applications. There are many types of tanning for example chrome tanning. Vegetable tanning, slow tanning and rapid tanning.
However the tanned leather is not yet suitable for making products until re-tanning has taken place.
Step 6: The re-tanning process involves many steps including drying, shaving, splitting, dying, stuffing and drying again. All these processes use water and therefor afterwards the leather needs to be dried. This can be done using a vacuum temperature controlled or by simple exposure to the open air.
Step 7: The final part of the production process is finishing which changes the surface texture of the leather. Mechanical finishing operations may include, polishing, ironing and plating, embossing and tumbling. Chemical finishing involves the application if a film, natural or synthetic by using curtain coaters, roller coating and spraying. Once all this is done the leather is ready to use to make products.

FAIRTRADE

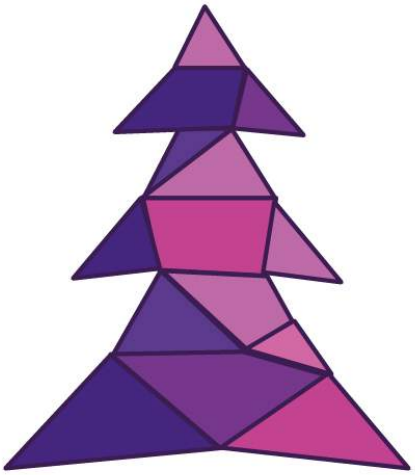


RADIOACTIVE

BICYCLE



COTTON PLANT



TREE

WATER WASTE

TRUE OR FALSE

1. In Bulgaria, 90% of home-based workers are women. True.
2. Sweatshop Workers get screamed at for going to the bathroom, even when working 10 hour shifts. True.
3. Sometimes women are contractually obliged not to become pregnant for 3 years. True.
4. In many countries, child banana workers only earn a half of the minimum wage. False-they actually only earn a third of the minimum wage.
5. More girls are trapped in child labour than boys. False: about 100 million boys are trapped in child labour, whereas about 68 million girls are trapped in child labour.
6. Around three quarters of all children trapped in child labour are engaged in hazardous work. False – actually around one half.
7. 40% of all employed adolescents aged 15 to 17 years are in hazardous work. True.
8. 800 women die every day from causes linked to pregnancy, childbirth or postpartum. True.
9. About 20% of garment workers are unionised. False – only between 5 and 10% of workers are unionised, and most of these are in the 'yellow' unions established by factory managements.
10. 50% of Bangladeshi garment workers work from 8am until 8pm or 10pm. False – it's actually 80%.
11. Garment workers can be dismissed if they refuse to work overtime. True.
12. Worldwide, one out of every ten deaths among children under the age of five is due to a water-related disease. Actually one out of every five deaths.
13. Almost two thirds of households rely on women to fetch the family's water when there is no water source at home. True.
14. Worldwide, about 60 to 75 million people are employed in the clothing, footwear and textile industry. True.
15. In 2000, only 20 million people were employed in the clothing, footwear and textile industry worldwide. True.
16. According to the report 'Global Wage Trends for Apparel Workers, 2001-2011', Vietnamese garment workers' wages were only 22% of the living wage. True
17. When female workers fail to meet impossible targets, they have to suffer verbal abuse: for instance they can be called "dogs and donkeys" and to "go and die". True.
18. There is a global minimum wage. False.
19. Fashion is the most polluting industry in the world. False-it is the second most polluting industry (after oil) in terms of its environmental impact.
20. In Uzbekistan, forced labour among adults is common as well as forced labour among children. Therefore, in schools across the country 50% of teachers are absent at any given time. True.
21. A reduction in biodiversity will have a minimal impact on human populations. False
22. Activities that lead to a reduction in biodiversity occur only in less industrialised countries. False
23. Strategies that are important for developing a sustainable world are to consume less, recycle more, lower the worldwide fertility rates and reduce rural world poverty. True
24. Eutrophication is the rapid growth of plant life and the death of animal life in a shallow body of water as a result of excessive nutrients. True
25. Only organic nutrients contribute to water pollution. False
26. Ozone near the Earth's surface is beneficial, but ozone in the stratosphere is considered pollution. False

27. The primary sources of acid precipitation are burning of high sulphur coal and oil for power, and nitrogen oxide from automobile exhaust. True
28. Polluted groundwater is generally less harmful than polluted surface water. False
29. The Earth's water supply is equally divided between salty ocean water and freshwater. False
30. The GDP (Gross Domestic Product) includes the environmental costs of producing goods and services and is a good measure of sustainability. False
31. The primary human-made greenhouse gases are carbon dioxide (CO2), methane (CH4, nitrous oxide (N2O), CFCs, and halons. True
32. Agricultural practices around the world are contributing to an increase in biodiversity. False
33. Running tap water for two minutes is equal to 3-5 gallons of water. True
34. Every time you open the refrigerator door, up to 30 percent of the cold air can escape. True
35. A full bath is equal to approximately 60 gallons of water. True
36. Sustainability is the use of a resource that doesn't cause long term depletion of the resource or affect the diversity of the ecosystem. TRUE.
37. Resources and limiting factors are the only things that control the population of organisms. FALSE.
38. Cotton accounts for about 50% of Uzbekistan's export earnings. True.
39. The fashion industry is worth more than the GDP of the UK? True.
40. Earth is in the midst of the sixth extinction crisis, the fifth being that of dinosaurs. True.
41. The UK produces around one million tonnes of textile waste a year. True.
42. Over 700,000 tonnes of recyclable textiles are landfilled in the UK each year. True.
43. 'A loom was household furniture in the ancient Greece'. True
44. 'The British creativity is known all over the world. For example, a record 321 British womenswear, accessory and shoe designers exhibited in Paris during March 2014 as part of Paris Fashion Week'. True
45. Manufacturers recycle more than consumers? True
46. American generate more textile waste per year than Brits? False
47. 'Americans generate almost 13 million tons of textile waste per year and Britons generate about 1.12 million tons of textile waste a year'. True
48. 'One in four American women own twenty pairs of jeans, but only wear four of them regularly'. True
49. 'The U.S. textile recycling industry creates around 17,000 jobs and removes 2.5 billion pounds of post-consumer textile product from waste stream each year'. True
50. 'In 1 year, discarded clothing would fill Wembley Stadium'. True
51. 'The UK produces around 1 million tonnes of textile waste a year'. True
52. 'There only seven 100% car-free cities in the world'. False
53. 'The city of Masdar is the first zero-carbon city in the world'. False
54. 'Cocoa producers tend to re-invest fairtrade premium in improving productivity and quality'. True
55. At the current pace, oceans will go fishless by 2048. True
56. At the current pace, gas reserves will last forever. False
57. George W. Bush is a former USA president famous for his peaceful approach to politics and strong environmental awareness. False
58. 1/3 of the planet is desertified, with livestock as the leading driver.True
59. No sharks are killed in fishing lines and nets yearly. False
60. 50% of grain is fed to livestock. True
61. A crack as small as 1/16th of an inch around a window frame is not comparable to leaving the window open three inches. False

62. A farm with 2,500 dairy cows produces the same amount of waste as a city of 411,000 people. True
63. 'Achieve gender equality' is not one of the UN's sustainable development goals. False
64. PETA defends the right to use fur as a human garment. False
65. Although accounting for only 5% of the world's population, Americans consume 26% of the world's energy. True
66. An automatic dishwasher uses more hot water than doing dishes by hand. False
67. An incandescent light bulb only uses 10% of the electricity to produce light. The other 90% is wasted as heat. True
68. Animal agriculture is not responsible for 91% of Amazon's destruction. False
69. As many as 650,000 whales, dolphins and seals are killed every year by fishing vessels. True
70. Global warming is a hoax. False
71. Cycling instead of taking the car increases your carbon emissions. False
72. Biodegradable products need to be burnt to work. False
73. Plastic is the most sustainable material there is because it decomposes really fast! False
74. Littering is good for the environment because it spreads the waste instead of concentrating in one single place. False
75. There is enough food to feed 10billion people in a world of 7 billion. True
76. Enough sunlight falls on the earth's surface every hour to meet world energy demand for an entire year. True
77. The Brundtland report was named after the chairman of the World Commission on Environment and Development (WCED). True
78. 1 out of every 113 people in the world is a refugee. True
79. The 2016 Olympic Games in Rio was the first to have a team of refugees. True
80. Every minute 24 people are displaced. True
81. Hydroelectric power is generated by wind turbines place on the sea. False
82. If a person yelled for 8 years, 7 months, and 6 days, he or she would produce enough energy to heat one cup of coffee. True
83. Improve nutrition and promote sustainable agriculture are bad actions for developing countries. False
84. The land required to feed a meat eater person per year is 18x as much as a vegan. True
85. 51% of all worldwide greenhouse gas emissions comes from livestock and their by-products. True
86. Less than 6 million animals are killed for food every hour. False
87. Low carbon emissions means more global warming. False
88. Farmer's markets were created to sell the same products from the supermarket but at a higher price. False
89. Using a dark background on your computer helps you save on electricity. True
90. Turning off the light in empty rooms only increase your utility bill as turning them on again consume even more electricity. False
91. Organically produced products use fewer pesticides. True
92. High concentration of people and poorly planned infrastructure are the main reasons for pollution in developing countries. True
93. Running tap water for two minutes is equal to 3-5 gallons of water. True
94. Social injustice is essential to maintain power balance. False
95. Sustainable behaviour means to buy as many organic products as possible. False
96. Carbon footprint is the scientific name for stepping on coal. False
97. The most energy-intensive part of the food chain is the kitchen. True
98. The second largest producer of nuclear-generated electricity is France. True
99. Fossil fuels are the most common kind of renewable energy. False
100. If a river is polluted in China, its pollution will never get to Germany. False

‘AGREE OR DISAGREE’ QUESTIONS

1. Workers in the garment industry should be grateful for the jobs fashion companies provide.
2. I would pay more for my clothes if the workers got a better wage.
3. Homeworking is better for women than working in a factory.
4. Low pay is fine for workers in developing countries because the cost of living is lower there.
5. If children are found working in a factory, the factory should be closed.
6. Trade unions are a bad influence on workers and simply cause trouble.
7. It is entirely companies’ responsibility to make sure that the workers who make their clothes are treated fairly.
8. It is better to buy clothes made in Britain because it protects British jobs.
9. It is better to buy garments from China because it creates jobs for Chinese people.
10. The workers who make clothes really do not worry me. My concern is that I look good and can afford to buy the latest fashion.
11. It is better to buy clothes from independent retailers than from high street chains.
12. To create a more sustainable environment industry should only exist in highly technological countries
13. If children in sweatshops are not working they will certainly be in school so that they can go to uni.

APPENDIX 9 T-SHIRT BREAKDOWN

Image from: thefableists.wordpress.com/category/sustainability/

The toxic price of leather

Link: https://www.youtube.com/watch?v=CMBIG0UazrA

Questions

1) What is the name of the first person seen on the video?
    a. Saida.
2) What falls on the stream while the children are playing?
    a. A shuttlecock.
3) What is the name of the river?
    a. Ganges.
4) What is the director's name?
    a. Sean Gallagher.
5) What is the name of the NGO Rakesh Jaismal works for?
    a. EcoFriends NGO.
6) How much toxic tannery waste is generated every day in Kanpur?
    a. 50 million litres.
7) What decreased the farming in the region?
    a. Chromium.
8) Were all people affected by diseases tannery workers?
    a. No.
9) Why the government is not improving the situation in Kanpur?
    a. Tax revenue.
10) Which grant supported the project?
    a. Pulitzer Center.

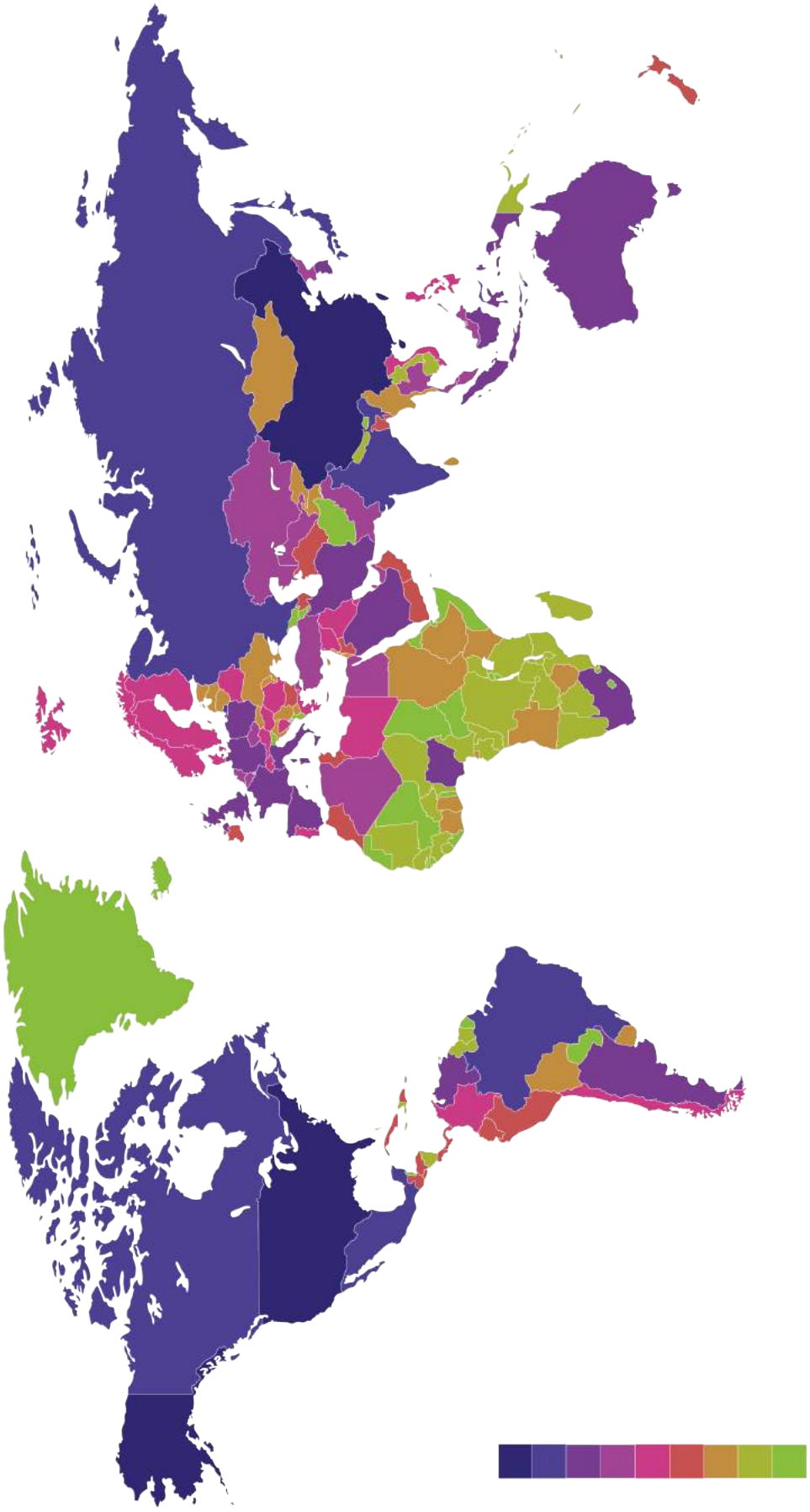
Fairtrade: improving lives

Link: https://www.youtube.com/watch?v=4tvLHDxv4B4

Questions

1) Is fair trade charity?
    a. No.
2) Why does fair trade focus on agricultural workers?
    a. Weak laws protecting workers.
3) Which country Paul Rice (President and CEO for the Fair Trade USA) uses as an example of child labour exploitation?
    a. Gana.
4) How much do the Ugandan farmers get from the final retail price of their products?
    a. 8%.
5) What increases HOPE, PRIDE and DIGNITY amongst fair trade contributors?
    a. Solving their own problems.

Production distribution



Countries by carbon dioxide emissions in thousands of tonnes per annum, via the burning of fossil fuels (blue the highest and green the lowest).

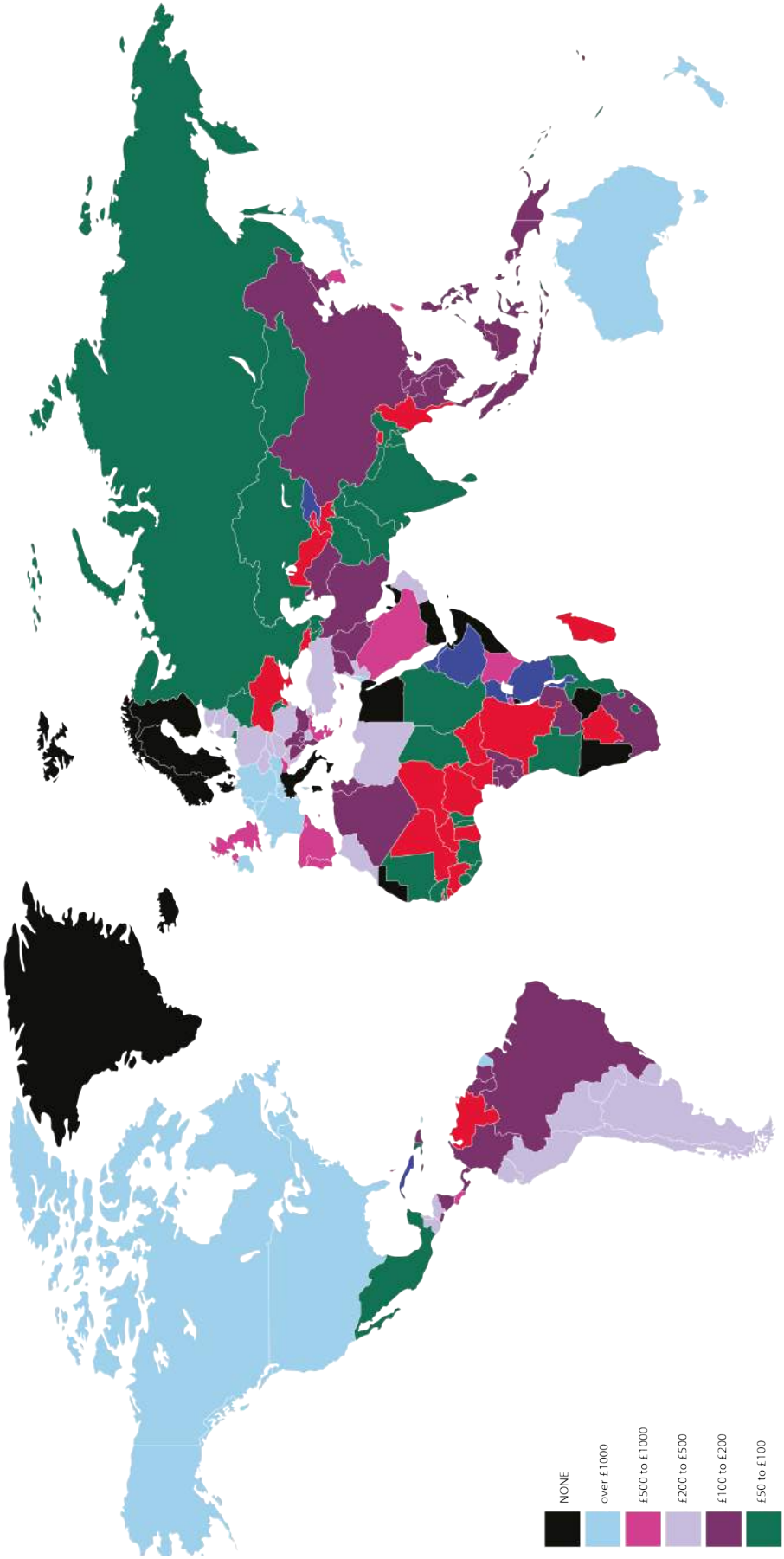
Map adapted from design by Freepik

Table 1: Production Distribution

Data gathered mainly through Wikipedia.

Country	% per country	Emission per capita (t)
China	29.5	5
United States of America	15	7.6
European Union	9.6	6.7
India	6.6	1.8
Russia	5	12.4
Japan	3.6	10.1
Germany	2.2	9.3
International Shipping	1.7	based on the world
Iran	1.7	7.9
South Korea	1.7	12.3
Canada	1.6	15.9
Brazil	1.4	2.5
Saudi Arabia	1.4	16.8
International Aviation	1.4	based on the world
Mexico	1.3	3.7
Indonesia	1.3	1.8
United Kingdom	1.2	6.5
Australia	1.1	17.3
South Africa	1.1	7.4
Turkey	1	4.7
Italy	0.9	5.5
France	0.9	5
Poland	0.8	7.8
Taiwan	0.8	11.8
Thailand	0.8	4
Ukraine	0.7	5.5
Spain	0.7	5.1
Kazakhstan	0.7	14.2
Malaysia	0.6	7.5
Egypt	0.6	2.7
United Arab Emirates	0.6	21.3
Argentina	0.6	4.8
Venezuela	0.5	6.3
Vietnam	0.5	2.1
Pakistan	0.4	0.9
Netherlands	0.4	9.4
Algeria	0.4	3.5
Iraq	0.4	4
Uzbekistan	0.3	4.2
Czech Republic	0.3	10.4
Kuwait	0.3	28.33
Belgium	0.3	8.7
Philippines	0.3	1
Nigeria	0.3	0.5
Qatar	0.2	39.13
Chile	0.2	4.4
Romania	0.2	3.6
Oman	0.2	18.92

Wage distribution



Data collected and coverted on basis of minium wage per official hour/week

Map adapted from design by Freepik

Table 2: Wage Distribution

Minimum wages according mainly to Wikipedia with conversions done on the 15th November 2016 based on open market exchange rates.

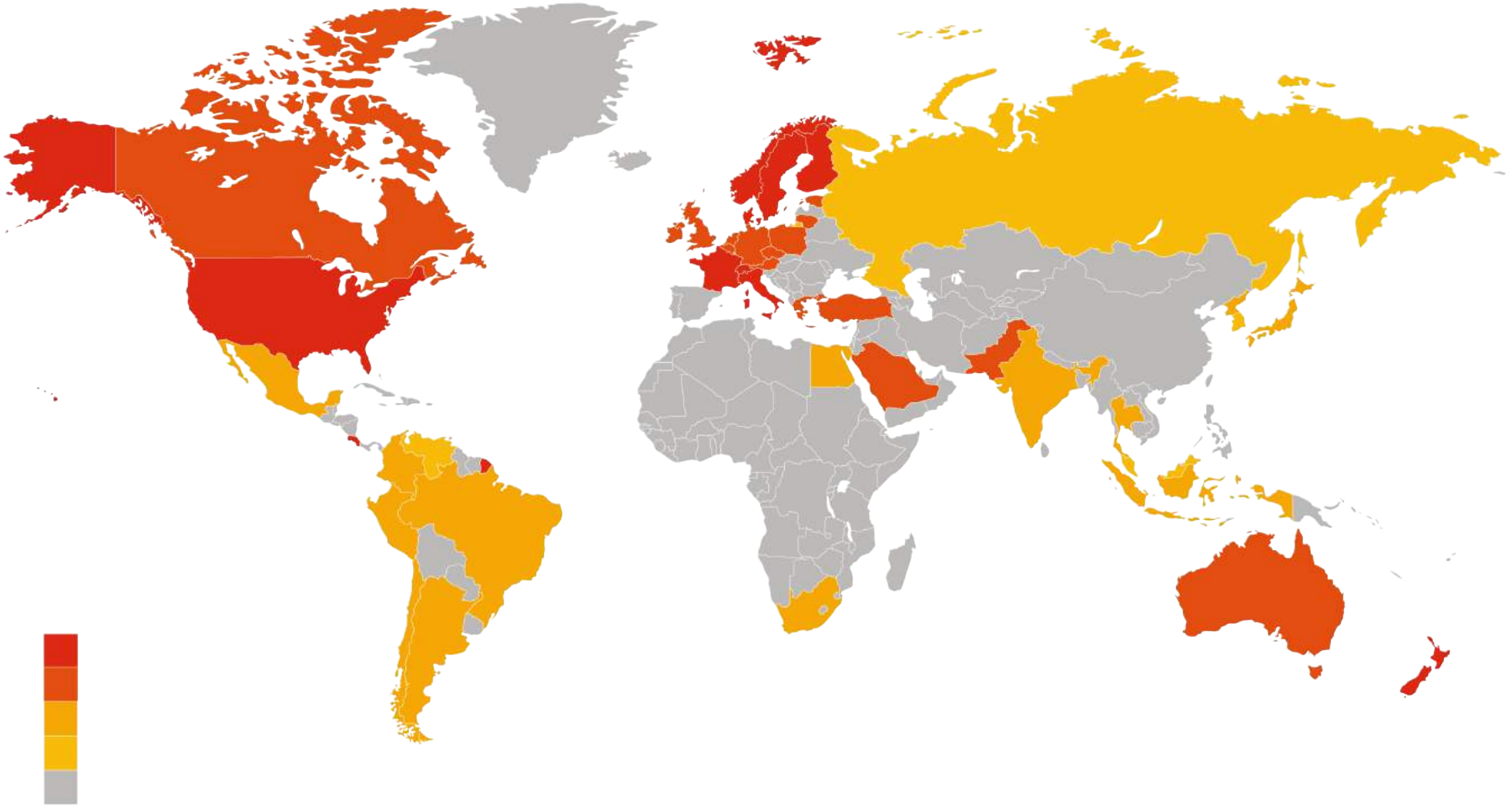
Country	Per month	Pound
Brunei	None	None
Burundi	None	None
Denmark	None	None
Djibouti	None	None
Egypt	None	None
Finland	None	None
Iceland	None	None
Italy	None	None
Liechtenstein	None	None
Namibia	None	None
Nauru	None	None
Norway	None	None
Qatar	None	None
Singapore	None	None
Somalia	None	None
Sweden	None	None
Tonga	None	None
Tuvalu	None	None
United Arab Emirates	None	None
Yemen	None	None
Zimbabwe	None	None
Switzerland	$4028	£3,244.99
Australia	A$2892.61	£1,755.87
Luxembourg	€ 1,922.96	£1,660.58
Monaco	€ 1,715.94	£1,481.81
San Marino	$1763	£1,420.29
New Zealand	NZ$2360.7	£1,347.99
Belgium	$1673	£1,347.78
Ireland	€ 1,534.45	£1,325.08
Netherlands	€ 1,524.60	£1,316.57
Germany	€ 1,480.27	£1,278.29
France	€ 1,466.62	£1,266.51
Canada	C$2016.70	£1,205.60
Japan	141556 Japanese yen	£1,046.40
Austria	€ 1,200.00	£1,036.26
Israel	$1283	£1,033.59
United States of America	$1247	£1,004.59
United Kingdom		£887.95
Andorra	€ 975.87	£842.72
The Bahamas	$903	£727.46
South Korea	1037160 South Korean Won	£713.57
Rwanda	$883.32	£711.61
Slovenia	$881	£709.74
Spain	€ 764.40	£660.10
Costa Rica	₡450,775.52	£654.99
Cyprus	€ 746.50	£644.64
Bahrain	$800	£644.49
Malta	€ 728.04	£628.70
Kenya	77722 shillings	£615.33
Greece	€ 683.76	£590.46
Saudi Arabia	$720	£580.04
Hong Kong	$688	£554.26
Portugal	€ 618.33	£533.96
Taiwan	$635	£511.56

Oman	$592	£476.92
Saint Kitts and Nevis	EC$1548	£461.40
Turkey	$556	£447.92
Barbados	$538.36	£433.71
Antigua and Barbuda	EC$1410.4	£420.38
Palau	$516	£415.69
Poland	€ 434.00	£374.78
Croatia	$464	£373.80
Estonia	€ 430	£371.33
Federal States of Micronesia	$455.8	£367.20
Lebanon	$450	£362.52
Slovakia	€ 405.00	£349.74
Grenada	ec$1161.00	£346.05
Hungary	€ 400.00	£345.42
Ecuador	$427	£343.99
Lithuania	€ 380.00	£328.15
Czech Republic	$407	£327.88
Trinidad and Tobago	$405.92	£327.01
Argentina	$405	£326.27
Latvia	€ 370	£319.51
Chile	$395	£318.21
Seychelles	SR4943.28	£298.50
Uruguay	$349	£281.16
Marshall Islands	$344	£277.13
Paraguay	$330	£265.85
Libya	$325	£261.82
Kiribati	$324.47	£261.40
Vanuatu	$323	£260.21
Saint Vincent and the Grenadines	EC$867.16	£258.47
Belize	$319.27	£257.21
Honduras	7244.71 Honduran Lempiras	£252.06
Romania	$312	£251.35
Peru	$294	£236.85
Republic of Macedoni	$289	£232.82
Morocco	$287.5	£231.61
Jordan	$268	£215.90
Bolivia	1,805 Bolivian bolivianos	£209.46
Guatemala	1935.17 Guatemalan quetzales	£207.93
Dominica	$258	£207.85
Maldives	$242	£194.96
Bosnia and Herzegovina	$240	£193.35
Bulgaria	$239	£192.54
Colombia	$237	£190.93
Brazil	$236,16	£190.25
Fiji	FJ$478.85	£185.30
Gabon	$225	£181.26
Dominican Republic	10,358 Dominican pesos	£180.80

Equatorial Guinea	$224	£180.46
Syria	$221	£178.04
Tunisia	$220	£177.23
Kuwait	$216	£174.01
China	$215	£173.21
Iran	$215	£173.21
Montenegro	$215	£173.21
Iraq	$214	£172.40
Serbia	$206.4	£166.28
Jamaica	J$26660	£165.94
El Salvador	$198.97	£160.26
Malaysia	RM850	£157.85
Zambia	1251946.33 Zambian Kwacha	£157.31
Papua New Guinea	605.44 Papua New Guinean Kina	£153.83
Panama	$187.5	£151.05
Suriname	$180	£145.01
North Korea	$178.45	£143.76
Samoa	$178.02	£143.41
Albania	$178.00	£143.40
Nicaragua	5160.43 Nicaraguan cordobas	£142.62
Thailand	$172	£138.56
Algeria	$170.00	£136.95
Republic of the Congo	$170	£136.95
Guyana	G$35,000.00	£136.04
Kosovo	€ 150.00	£126.53
Indonesia	$157	£126.48
Turkmenistan	$156	£125.67
Philippines	PhP7611	£124.65
Comoros	$150	£120.84
Cambodia	$140	£112.78
Laos	$135	£108.76
Vietnam	VND2925000	£105.39
South Africa	$125	£100.70
Pakistan	$124	£99.90
Timor-Leste	$115	£92.64
Belarus	$114	£91.84
Liberia	$114	£91.84
Russia	€ 100.00	£86.36
Armenia	$107	£86.20
Lesotho	$107	£86.20
Cape Verde	11,000 Cape Verdean escudos	£85.89
Mauritania	$100	£80.56
Mauritius	$98.9	£79.67
Chad	59,995 CFA francs	£78.94
India	$94.06	£75.78
Angola	15,003.00 Kwanza	£72.85
Sierra Leone	500,000 Sierra Leonean leones	£71.72

Solomon Islands	SI$696.6	£71.60
Mongolia	$87	£70.09
Mexico	$81.7	£65.82
Saint Lucia	$81.33	£65.52
Swaziland	$74.5	£60.02
Nepal	$74	£59.61
Moldova	$73	£58.81
Afghanistan	$72.00	£58.00
Cote d'Ivoire	$72	£58.00
Sri Lanka	$70.75	£57.00
Sudan	$70	£56.39
Togo	$70	£56.39
Mozambique	5233.5 Mozambican meticias	£55.21
Bangladesh	$68	£54.78
Senegal	$67.94	£54.73
Haiti	4223.21 Haitian gourdes	£54.30
Kazakhstan	$67	£53.98
Benin	40,000 CFA francs	£52.63
Azerbaijan	$63	£50.75
Guinea	$62	£49.95
Venezuela	$61.93	£49.89
Niger	$60	£48.34
Myanmar	77400 Myanmar kyat	£48.15
Cameroon	36,270 CFA francs	£47.73
Botswana	$58	£46.73
Central African Republic	35,000 CFA francs	£46.05
Mali	$57	£45.92
Burkina Faso	34,664 CFA francs	£45.61
Bhutan	3,750 Bhutanese ngultrum	£44.50
Ukraine	$52.6	£42.37
Georgia	$48	£38.67
Madagascar	133966.7 Malagsy Ariary	£33.32
Sao Tome and Principe	$40	£32.22
Democratic Republic of the Congo	$39.34	£31.69
Nigeria	$38	£30.61
Ghana	150.5 Ghanaian cedis	£30.40
Uzbekistan	$35	£28.20
Tajikistan	$31	£24.97
Guinea-Bissau	$30	£24.17
The Gambia	$26.87	£21.65
Eritrea	$24	£19.33
Ethiopia	$21	£16.92
Malawi	MK 14785.55	£16.51
Tanzania	40000 Tanzanian Shillings	£14.80
Kyrgystan	$14	£11.28
Cuba	$9 (2012)	£7.25
Uganda	$1.7	£1.37

Consumption distribution



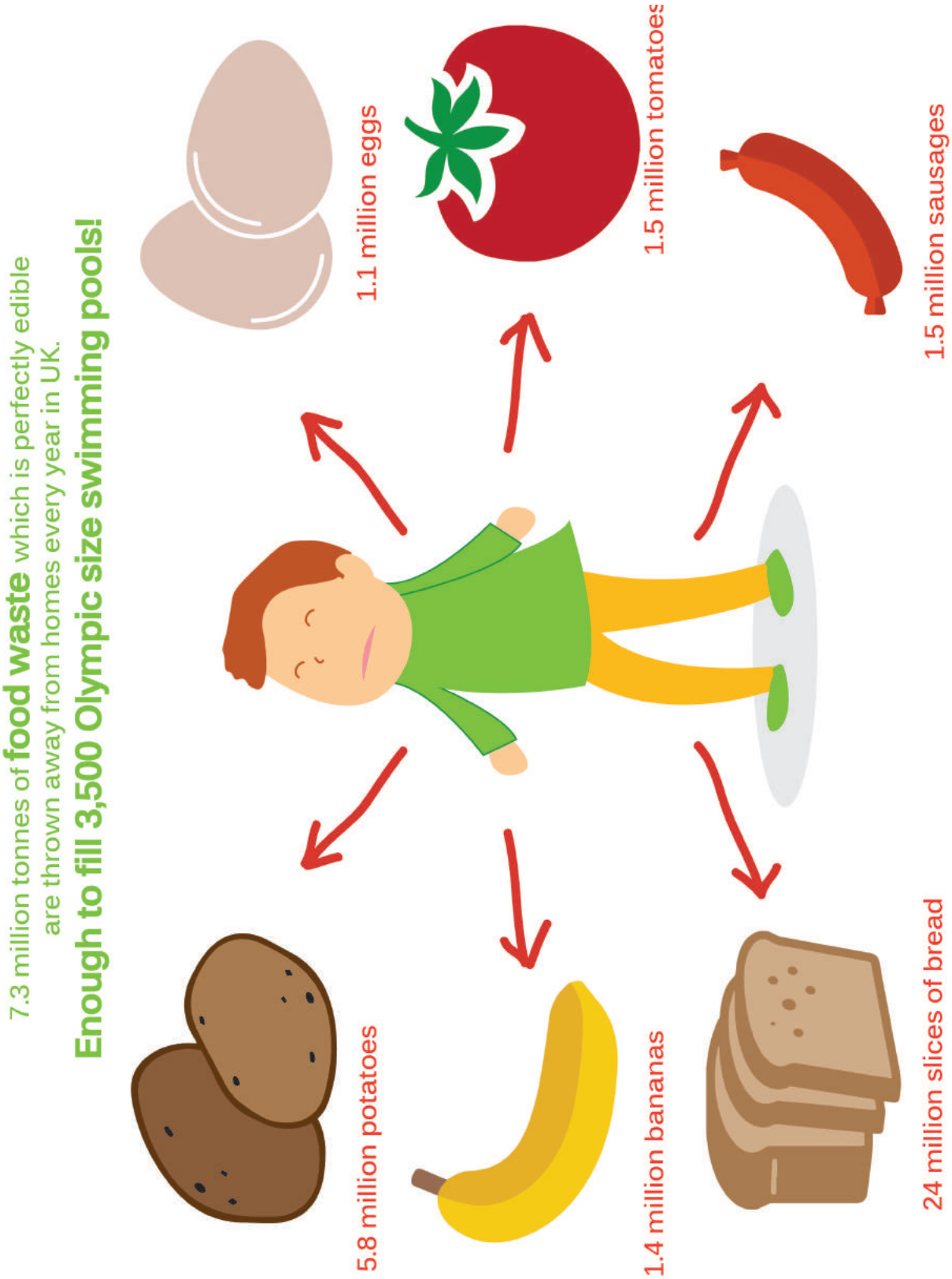
Map adapted from design by Freepik

Table 3: Consumption Distribution

The BigMac index compared to the Minimum wage index.

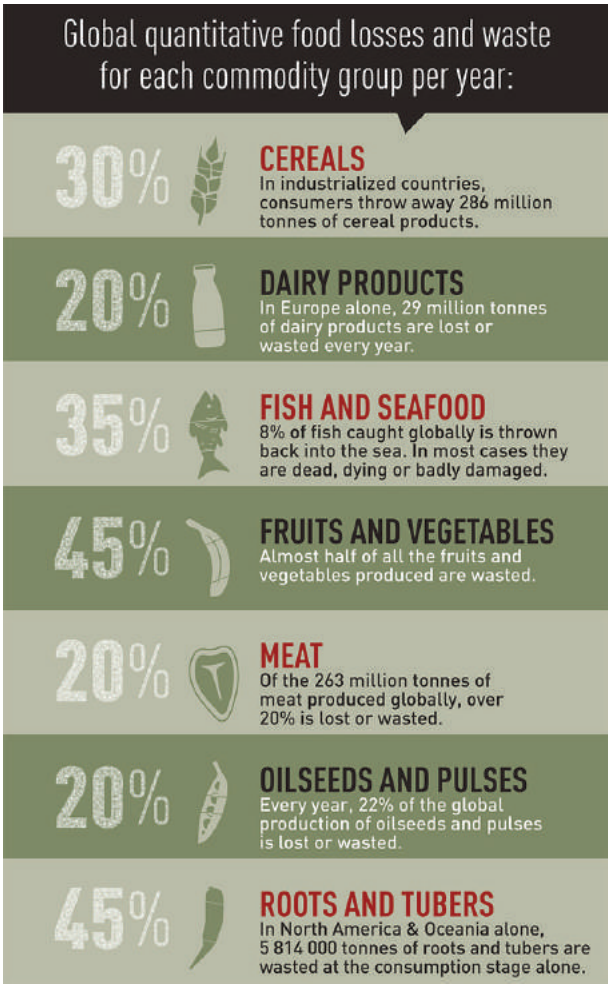
Cost comparison of the BigMac			
Country	US$	GBP	Minimum wage
Switzerland	6.44	5.18	£3,244.99
Sweden	5.23	4.21	None
Norway	5.21	4.19	None
United States of America	4.93	3.97	£1,004.59
Finland	4.41	3.55	None
France	4.41	3.55	£1,266.51
Denmark	4.32	3.48	None
Italy	4.3	3.46	None
Israel	4.29	3.45	£1,033.59
Belgium	4.25	3.42	£1,347.78
Ireland	4.25	3.42	£1,325.08
United Kingdom	4.22	3.4	£887.95
Canada	4.14	3.33	£1,205.60
Costa Rica	4.02	3.23	£654.99
European Union	4	3.22	Irrelevant
New Zealand	3.91	3.15	£1,347.99
Germany	3.86	3.11	£1,278.29
Austria	3.76	3.02	£1,036.26
Spain	3.76	3.02	£660.10
Australia	3.74	3.01	£1,755.87
Uruguay	3.74	3.01	£281.16
Netherlands	3.71	2.98	£1,316.57
Greece	3.6	2.9	£590.46
South Korea	3.59	2.89	£713.57
United Arab Emirates	3.54	2.85	None
Turkey	3.41	2.74	£447.92
Brazil	3.35	2.7	£190.25
Singapore	3.27	2.63	None
Estonia	3.23	2.6	£371.33
Porugal	3.23	2.6	£533.96
Saudi Arabia	3.2	2.57	£580.04
Japan	3.12	2.51	£1,046.40
Thailand	3.09	2.49	£138.56
Hungary	3.08	2.48	£345.42
Czech Republic	2.98	2.4	£327.88
Chile	2.94	2.37	£318.21
Peru	2.93	2.36	£236.85
Pakistan	2.86	2.3	£99.90
Mexico	2.81	2.26	£65.82
Philipines	2.79	2.24	£124.65
China	2.68	2.16	£173.21
Vietnam	2.67	2.15	£105.39
Hong Kong	2.48	2	£554.26
Sri Lanka	2.43	1.95	£57.00
Colombia	2.43	1.95	£190.93
Argentina	2.39	1.92	£326.27
Poland	2.37	1.91	£374.78
Indonesia	2.19	1.76	£126.48
Egypt	2.16	1.76	None
Taiwan	2.08	1.67	£511.56
India	1.9	1.53	£75.78
Malaysia	1.82	1.46	£157.85
South Africa	1.77	1.42	£100.70
Ukraine	1.54	1.24	£42.37
Russia	1.53	1.23	£86.36
Venezuela	0.66	0.53	£49.89

Food Loss and Food Waste in UK



Datas from: http://www.wrap.org.uk/content/household-food-waste-uk-2015-0

Food Loss and Food Waste in the World



Datas from: www.fao.org

Don't worry, we can all make something to help reduce food waste!

* Datas from:http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1334852610766/Chap3.pdf
** http://ec.europa.eu/eurostat/documents/2995521/6757479/8-26032015-AP-EN.pdf/a2982b86-9d56-401c-8443-ec5b08e543cc

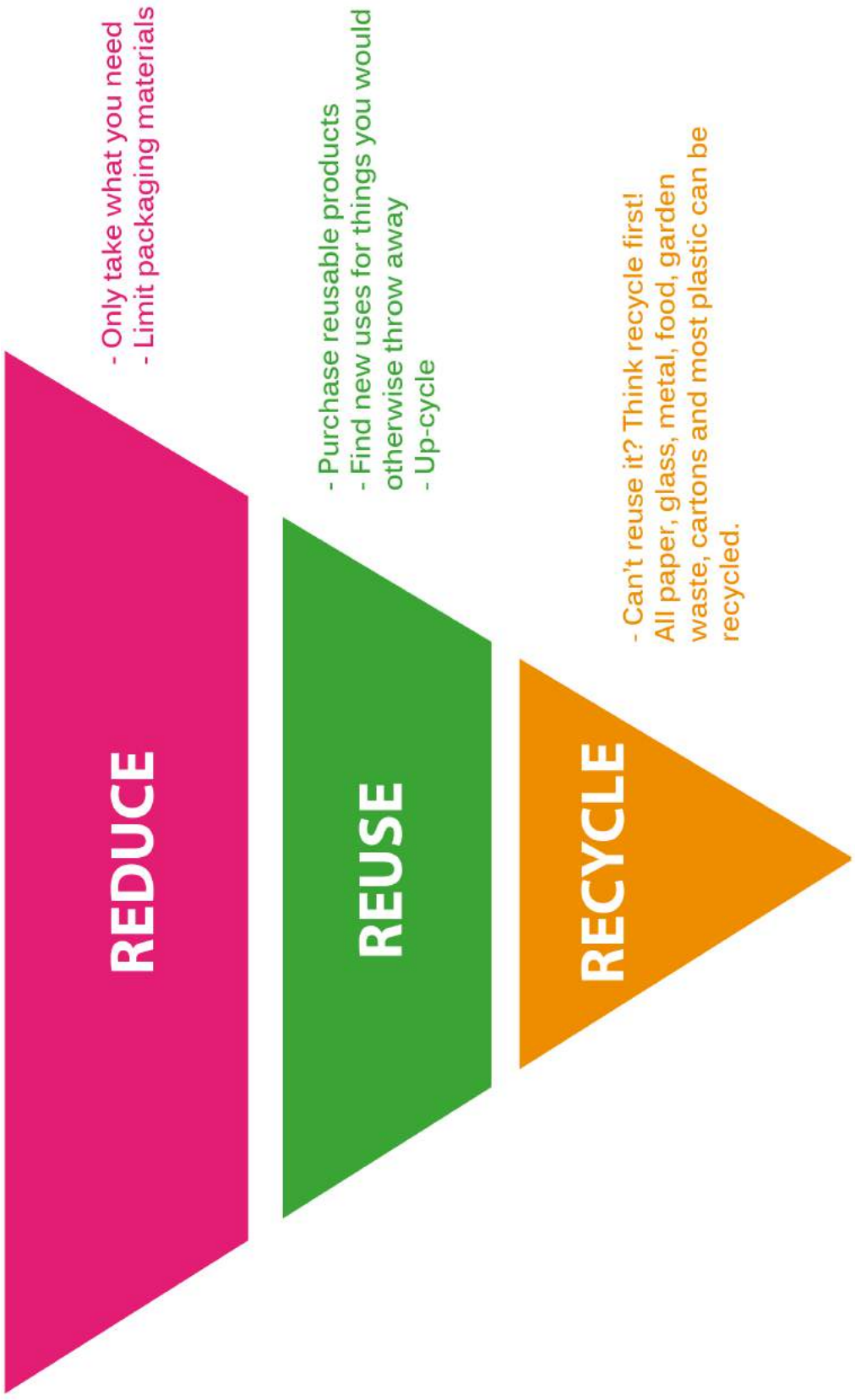
Amount of waste

Current global waste generation levels are approximately 1.3 billion tonnes per year, and are expected to increase to approximately 2.2 billion which is .42 kg per person per day! However, global averages are broad estimates only as rates vary considerably by region, country, city, and even within cities*.
Each person in the EU generated 481 kg of municipal waste in 2013** and the average American generates 29 pounds of garbage a week. As a nation, that amounts to about 9 billion pounds per week!

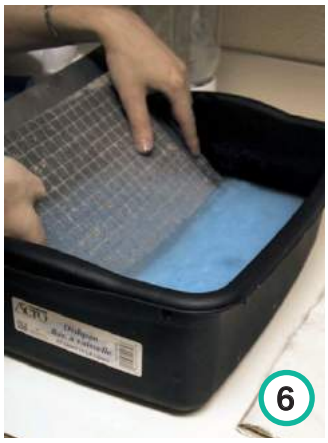
Pictures from Gregg Segal: www.greggsegal.com/7days.php

* Datas from:http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1334852610766/Chap3.pdf
** http://ec.europa.eu/eurostat/documents/2995521/6757479/8-26032015-AP-EN.pdf/a2982b86-9d56-401c-8443-ec5b08e543cc

Don't worry, we can all make something to help reduce waste!



Step by step of how to recycle paper: intructions*



*The pictures of this tutorial are taken by *B Zedan*, from this link: https://www.flickr.com/photos/bzedan/sets/967347/

What you'll need:

- Scrap paper
- Water
- A blender or food processor
- A small, sturdy piece of screen
- A small piece of mesh
- A cloth and a sponge
- A rectangular bin to hold water (a 13" x 9" pan would also work)
- News paper pages
- Optional: decorations like dried flowers or leaves and painting

Steps

1- Prepare the screen (image 1): take the sturdy piece of screen and the mesh and cut them so that they have the same dimension. Place them one on top of each other and an put them together with some duct tape all around the edges (this will both link them together and also cover the sharp edges).

2- Tear the paper into small pieces and put into a blender with warm water. Blend until the mixture becomes a fairly smooth pulp (you can add some painting into the blender to obtain coloured paper - images 2 and 3)

3- Pour the pulp into your bin or pan and add some water to it (images 4 and 5).

4- Holding the screen at about a 45 degree angle, dip it into the pulp. Shake the screen back and forth a bit to obtain an even consistency of pulp covering (images 6 and 7).

5- Pull the screen slowly out of the container, tilting it to drain of excess water. At this point, you can add decorations like dried leaves and flowers. Be sure to add a little more pulp to cover the decorations so they adhere to the paper (image 8).

6- Quickly flip the screen upside down onto the cloth (image 9).

7- Soak up as much water as you can by pressing the sponge through the back of the screen. Once you have gotten as much water out of the paper as you can slowly pull the screen back from the paper. You now have the pulp on top of the cloth as an actual sheet. (image 10).

8- At this point, You can let it dry on the cloth or you can let your paper dry on another surface like a piece of newspaper. In order to do that put a piece of newspaper onto the pulp and flip everything upsidedown. Slowly remove the cloth from the pulp that is now sitting on top of the newspaper (image 11).

9- Now be sure to let your paper dry for a day or so.

'Teach us how to fish - do not just give us the fish': does buying fairtrade products really make a difference to people's lives?*

INTERVIEW 1 - GERARDO ARIAS CAMACHO, COFFEE PRODUCER, COSTA RICA

Gerardo is a coffee farmer in Llano Bonito, San José, Costa Rica. He is a board member on his village cooperative, which is a member of the Fairtrade consortium COOCAFE. He is married with three children. In the 1980s, the price of coffee fell so low that it didn't cover the cost of production.

Many farmers abandoned their land and went to the cities to find work. Some even left the country. In the mid-90s, I decided to go to America to make money and support my family. After eight years, I had earned enough to buy the family farm so that my parents could retire. But coffee prices were still so low that I was forced to go back to the States for another two years.

The coffee market was so unstable. We did not have a local school, good roads or bridges. Now that our consortium is Fairtrade-certified, prices are stable and we receive a guaranteed premium. We spend the money on education, environmental protection, roads and bridges, and improving the old processing plant. We have sponsored a scholarship programme so that our kids can stay in school.

I believe that my cooperative would be out of business if it wasn't for Fairtrade. Free trade is not responsible trade. When prices go down, farmers produce more and prices drop further. Fairtrade is the way trade should be: fair, responsible and sustainable.

My oldest son is in college, my ten-year-old has already had as much education as me, and my little princess is in her second year at school. With the help of Fairtrade, they might all be able to go to university and get a degree. They won't have to jump the border from Mexico to America, leaving their country for ten years, like me. They can decide what they want in life. I tell them: 'You have two choices. You can be a coffee grower or you can be something else. But learn how to be a coffee grower first, like your father and your grandfather.'

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*Author: Rachel Dixon

Published: Wednesday 12 March 2008 – The Guardian

Link to article: https://www.theguardian.com/environment/2008/mar/12/ethicalliving.lifeandhealth

Since Fairtrade, our farms have become more environmentally friendly. Our coffee is now produced in a sustainable way. We have planted trees and reduced the use of pesticides by 80% in 10 years. We used to cut 20 hectares (50 acres) of forest down every year to fuel the ovens at our processing plant. Now we have a new oven which is fuelled by waste products, including coffee skins and the skins of macadamia nuts that we buy from farmers on the other side of Costa Rica. It is a win-win business.

Fairtrade is not a closed system, it is open to everyone. But we need more and more people to buy Fairtrade so that the market grows and other farmers can become certified. Fairtrade can be a tool to help farmers who are not certified. We educate the producers around us about market prices so that buyers have to offer them a competitive rate. It also benefits the wider community. When there was a hurricane, the new road became blocked and the bridge came down. We could afford to open the road and fix the bridge.

When you are shopping, look for the Fairtrade label - you can be sure that the money is going straight to the producers. It will help us, but it will also help people around the world, because the benefits of protecting the environment are for everyone. It is a matter of helping each other. As a Fairtrade farmer, I finally feel competitive - I feel that I have a tool in my hand. It has given me knowledge, so that I am more able to defend myself and my people. I feel there is a future in front of us, because we can stay in our own country and make a living growing coffee. Fairtrade is not charity. Just by going shopping, you can make a difference.

LUXURY BRANDS CAN NO LONGER IGNORE SUSTAINABILITY*

If I asked you to picture the consumer luxury market, you might imagine jewels, sports cars, watches, premium drinks, high-end shoes and apparel, and so on. A combination of high quality, glamour, celebrity, and attitude. With a few exceptions, it's been an industry not traditionally associated with concerns about environmental impacts, human rights, and wellness, even while those trends have been sweeping through the mainstream consumer products sector. But according to a new report, 2016 Predictions for the Luxury Industry: Sustainability and Innovation, that sustainability gap is closing fast.

First, the direct pressure: the laws are changing. The report points to the passage of the Modern Slavery Act in the U.K. in 2015, which requires larger companies doing business in Britain to publish a board-approved, public annual slavery and human trafficking statement. This kind of law clearly drives much more transparency and tracking up the supply chain. And it's a good thing, as 71% of U.K. retailers and suppliers think it's likely there are slaves in their supply chain.

Second, the indirect and more powerful pressure: social norms are changing, starting with high-profile tastemakers. Celebrities are more invested than ever in sustainability. Leonardo DiCaprio and Mark Ruffalo have produced movies and started organizations to tackle climate change and promote renewable energy. Harry Potter star Emma Watson is a vocal advocate on gender equality while also appearing regularly in fashion magazines. These names and others are lending their clout to the social and environmental agenda. Given their prominence in the fashion and luxury worlds, their beliefs, statements, and demands on companies matter.

Immagine: http://www.un.org.ua/en/information-centre/news/3781-dicaprio-climate-change-is-real

* Author: Andrew Winston

Published: Monday 8 February 2016 – Harvard Business Review
Link to article: https://hbr.org/2016/02/luxury-brands-can-no-longer-ignore-sustainability&cm_sp=Article-_-Links-_-End%20of%20Page%20Recirculation

Finally, there's the harsh reality of biophysical limits seriously compromising these companies' ability to source their products. Luxury goods require digging up, growing, and processing materials throughout the value chain, and that's all getting tougher.

This industry has some tough history to reconcile. "Blood diamonds" were not just a campaigner's evocative phrase, but based on real money flows to brutal dictators. Slavery is still a problem. Mines are immense operations that can impoverish people and land — or create jobs and build the economy.

Immagine: http://www.minesandcommunities.org/article.php?a=11614

But in our transparent world, the risk of not tackling sustainability is extremely high for this sector. As CSR and sustainability evangelist John Elkington told the report writers, "The implicit promise [in luxury] is that the consumer need not worry about anything. Everything is taken care of... Until it isn't, at which point the whole impression of invulnerability and perfection can deflate." An unsustainable piece of clothing or jewel is, in the end, anything but flawless. As we all wake up to that reality, the luxury companies have no choice but to act.

Image on left: https://upload.wikimedia.org/wikipedia/commons/8/8d/Kalgoorlie_The_Big_Pit_DSC04498.JPG
Image on right: https://www.reference.com/science/many-trees-cut-down-day-42bf5e6262028f2d

Topic 1:
The textile industry should be local not global!

Against:

- It is a good way to spread the wealth around the globe;
- Global commerce helps strengthen international relationships;
- Through these collaborations poor countries receive companies from abroad which help on the creation of qualified jobs;
- In order to fill these qualified positions the local community needs to be educated (formally), which means: better wages; better life quality; personal and professional growth.

For:

- The qualified positions (such as Research and Development) tend to remain in the developed/rich countries;
- Companies with good intentions don't move to poor countries unless they want to explore the locals;
- There are too many countries with none or very few environmental legislation, interested on these companies tax revenues and not in re-investing the money across exploited communities;
- Foreign companies don't set 'roots', they might leave from one day to the other.

Topic 2:
Textiles made from animal products are redundant in a modern world

Against:

- Animals raised for fur tend to have a much better quality of life than those raised for food consumption;
- Some species of animal that provide fur are endangering other animals;
- The price tag on fur guarantee the survival of primitive/traditional techniques;
- The quality of the material, and how it feels, makes this kind of product essential for the comfort of its users;
- Brands are now using road-kill instead of sacrificing animals.

For:

- There are several alternatives to animal fur which can be easily produced in a lab;
- With the increasing amount of animals close to extinction this practice is out-dated and inhumane;
- In most cases the animal has to be alive to be skinned (and the procedure is done without any anaesthetic);
- For such an expensive industry, there are very few benefits throughout the value chain (activities that will finish once a valuable good is delivered to the market).

Topic 3:
Fashion trends are so quick moving that sustainability is impossible

Against:

- There is always space for efficiency and sustainability;
- The choices made regarding fairer suppliers, environmentally conscious manufacturers or clean transportation do not imply they have to be slow or take longer to produce;
- Attitudes are changing and the consumer is seeing sustainability as a desired advantaged;
- The pace of fashion is indeed crucial, but the way this industry is moving exceeds the world's offer;

For:

- Cutting jobs given in poor countries in order to satisfy sustainable requirements might break small, poor countries/economies;
- The idea that every company in the world can provide sustainable alternatives might increase development in rich, developed countries, but weaken countries with no power for investments;
- The way the wealth is spread within the fashion industry guarantees more jobs to women around the world than any other industry;
- Earning £5 per month in exchange for the pollution and disadvantages of the fashion industry is still better than not earning anything at all.

Topic 4:
The textile industry in Britain is dead

Against:
- Luxury brands are stronger now than ever before;
- Consumers want to know more about the products they are buying and the story behind it;
- "Make in the UK" in now a trend as strong as "Made in Italy" and "Made in France";
- Many consumers know that products made in their own country will generate local jobs and help not only those people, but also the government with the tax collection and less need to pay benefits;
- Products produced in the UK need to comply with strict environmental and labour legislations, which guarantees good quality and still generates profits.

For:
- Most of British companies either fled to other countries or went bankrupted due to heavy competition;
- It's much cheaper to outsource production to countries where labour is extremely cheap;
- The profit margin is much higher once the raw material, production and labour are cheap;
- Consumers don't care about where their products came from, so why care?

Topic 5:
Landfills: essential or outdated?

Essential:

- It's safer to move the trash from heavily populated areas to rural zones;
- The potential for gas and energy production is high when it comes to decomposition;
- Landfills provide an alternative environment for fauna and flora;
- Separation cooperatives can profit from non-categorising, which they can separate into recyclable categories;
- Waste can be transported to other areas of the world so they can turn this into a profitable activity.

Outdated:

- Landfills can generate highly toxic and polluting chemicals, damaging the local environment;
- Even though the landfill's location is studied thoroughly water basins and soil systems are not protected;
- The choice of isolating the trash into emptier areas does not mean the trash ceases to exist;
- The UK is not big enough to contain the amount of trash Britain produces;
- Incorrectly disposed products can generate extremely toxic waste, which might still be active and difficult to safely dispose of;
- The accumulation of garbage can attract pests which transmit various diseases.

Topic 6:

Divide the group into 5 smaller groups the participants would then have to defend 5 points of view:

- **Conscious consumers:** 'I am a part of the improvement'
- **I don't make any difference consumers:** 'I am only one person, if I change nothing will happen'
- **Big companies:** 'I am more concerned about my profit'
- **Sustainable companies: 'We can make a difference, even if small'**
- **The government: 'I can regulate only if it is produced in my country'**


I don't make any difference consumers
'I am only one person, if I change nothing will happen'


Big companies:
'I am more concerned about my profit'


Sustainable companies:
'We can make a difference, even if small'


The government:
'I am more concerned about my profit'

Fringe Necklace*

To get your t-shirt fabric to curl, cut it into 1/2 inch strips and pull to stretch. When you let go, your t-shirt material should curl into a cord-like shape. You'll use this method in just about every piece on this list.

For this necklace, simply fold a piece of material in half, loop around the chain, and pull through. This type of knot is technically called a Lark's Head but we always refer to it as topsy tail.

T-Shirt Necklace*

Tools and Materials

1. Soft cotton T-shirt
2. Ruler
3. Scissors or rotary cutter

1.Lay the shirt on a flat surface; cut off the hem and discard. Then cut the body of the shirt horizontally into strips approximately 3/4 of an inch long. (They will actually be loops.)

2.One at a time, pull the loops open and stretch until the fabric starts to curl. Stack the loops on top of one another so that all the T-shirt side seams are in the same spot.

3.Once you have the thickness you desire, wrap the seams with a scrap piece of fabric (about 6 inches long) from the same shirt. Tuck the end of the scrap under itself.

*http://www.brit.co/tshirt-jewelry/

Denin*

You will need: an old pair of pants, an old belt, needle and thread, and a sewing machine (although you could do this project entirely by hand).

Instructions:

1. Cut off one leg, just below knee, with adult size pants, about 40cm.
2. Prepare your belt by cutting the following:
- one strap of about 10 cm, buckle included and still attached
- another strap of about 40 cm, starting to measure from the other extremity of the belt (so this part has the holes)
- two strips of about 3cm, each.

*http://pm-betweenthelines.blogspot.co.uk/2012/10/denim-snack-bag-recycling-project.html

3. Turn the leg inside out. Since the bottom seam will become the top of the bag, we will close the other end. Insert the belt part with buckle, at that end, making sure it's positioned right in the middle. Close the seam, and run a zigzag stitch to prevent fraying.
4. Make boxed corners as shown.
5. Attach the other strap, nicely centered in the back. To make the sewing easier, prepare the leather by making holes using an awl. Next, add the short strips with a couple of stitches. If you're smart, unlike me, you attach the strap and strips before sewing the bottom seam.

Tool belt*




You can use any size jeans you have; adult or children's. We will size the waist later since I am using a pair of mine for an 8 year old.
Lay out the jeans you are using on a flat surface. Using good strong scissors (one made for fabric if you have them), and start cutting from the fly. Be careful not to cut the metal teeth of the zipper or you'll damage your scissors. Cut as close to the waist band as possible.
I like to keep the little coin pocket that's found on most jeans by the front right pocket. They are a good size for small pencils and other shorter tools. Keep the belt loop that is near this pocket too. It's great for hanging tools from!
Continue to cut until you reach the back of the jeans. Cut around the two back pockets. They will be the two main tool holders*.

*http://www.instructables.com/id/Super-Easy-Recycled-Denim-Tool-Belt-for-Boys-amp/

Recycled T-shirt Market Tote*

Supplies Needed

- Old t-shirt
- Scissors

Step 1: Cut the arms off the t-shirt by cutting through both the front and back sides. Then cut around the neck opening on the t-shirt so the opening is now even on both sides. Trim the hem of the shirt if it is scalloped so that it is one straight, even line.
Step 2: Cut slits into the bottom of the t-shirt. Cut them so they are approximately 1" wide and 3" to 4" long. You can use the length of my scissor blades as a guide. Be sure to cut slits into the edges along the sides as well, and separate the front slit from the back.
Step 3: Turn the t-shirt inside out and begin to tie the strips together. Tie one strip from the front of the t-shirt to the corresponding strip directly on the back of the t-shirt. Continue down the line until each strip has been knotted.
Step 4: The previous step "closed" off the bottom of the bag, but if you were to turn it inside out again you would find tiny holes at the bottom of the bag between each tied strip. We're going to close off these holes by tying one tied strip to the tied strip right next to it. Pull the knot tight to secure.
Step 5: Turn the bag right side out so the fringed pieces are hidden away inside the bottom of the bag. The bottom should now look like the photo below:

* http://helloglow.co/recycle-your-t-shirt-into-a-no-sew-reusable-grocery-bag/

DIY Speakers*

How to make it:
Firstly grab the paper towel roll and your desired paint colour.
Then paint the paper towel roll covering it completely and allow it to dry.
Next grab your cups and cut two holes big enough for the paper towel roll ends to fit in either side of the two cups.
You can do this by marking a circle with the marker then cutting it out with scissors
Once this is done you will need to cut out a hole big enough for the speaker side of the phone to fit through the top of the paper towel roll.
Make sure to check your phone fits through the hole.
Then insert either end of the roll into the two plastic cups
Place your phone in the slot you created on top of the paper towel roll and your speakers are ready to use!

*http://www.instructables.com/id/Super-Easy-Recycled-Denim-Tool-Belt-for-Boys-amp/

Notebook cover *

You'll need: a notebook (with a neutral cover); thin fabric (enough to cover the notebook and have a few inches to spare around the edges); white glue; a paintbrush; a ruler and pencil; scissors

1. Trace the outline of the notebook on the back side of the fabric. If you have a thick binding, make sure you leave enough length to cover the spine.
2. Use the ruler to measure an allowance around the entire notebook that will give you room to glue the fabric inside the cover. Create a new outline that you'll use to cut out the fabric.
3. Cut out the fabric around the bigger of the 2 outlines.
4. Spread a thin layer of glue over the notebook and carefully affix the fabric. While the glue is still wet, make sure you can close the notebook (that you didn't pull the fabric too tightly over the spine).
5. Spread a thin layer of glue over the inside edge of the back cover, just on the side opposite the binding. Fold the fabric over the edge and glue down.
6. Cut the corner piece into a flap along the edge of the book. Cut a square out of the fabric so the raw edge won't show when you fold over the other piece of fabric.
7. Cut a slit in the fabric at the book's spine so you can fold it around where the pages are attached.
8. Spread a thin layer of glue over the inside edge and fold the piece that you just cut. Fold it over and glue it to the cover.
9. Repeat steps 4-7 for the rest of the edges.
10. Cleanly trim any pieces of fabric that are left around the binding and seal any raw edges with a dab of glue.
11. Let it dry completely.

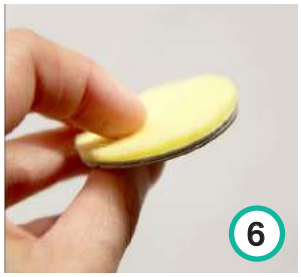
Pencil Case*

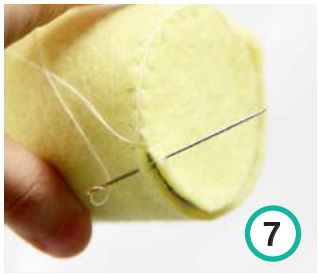
How to make it:
Materials: elastic band in color of your choice, solid colored card stock, double-sided adhesive and/or craft blue, foam brush, small mailing tube, patterned paper, a hole punch.

1. Using a saw or serrated knife cut the mailing tube into two pieces and cover with patterned paper using the adhesive or glue.
2. Roll the solid colored cardstock into a tube and insert it into the mailing tube. Glue it in place, allowing 1-2" to extend above the edge of the bottom portion of the tube.
3. Use a hole punch to place holes in the top of the mail tube as shown, and insert the elastic. Tie little knots to keep the elastic from slipping out. (Not pictured: use the hole punch to create notches in the bottom of the mail tube where the elastic can rest so it doesn't slip out of place.)

* https://www.buzzfeed.com/pippa/back-to-school-pencil-cases?utm_term=.ckPgJ5B8Y#.gbY-Dolkw1

Pencil Case*





How to make it:

1. Cut one of your empty rolls into 2 parts, with the ratio 1:3.
2. Join the other empty roll with the newly cut roll (the longer one!) with masking tape or scotch tape
3. Get a piece of rectangular felt, divide it into two according to the new length of the 2 rolls (length of one with extra roll attached and length of the short leftover roll), cut it and join them back with a zipper.
4. Fold into half and sew the side.
5. Get a little piece of cardboard and cut out a circle (circle's diameter = toilet roll's diameter). Make two of this. Use a thicker cardboard or just stack a few if you want a thicker base for your case.
6. Add a piece of circular felt on each of them.
7. Stitch the 2 circular pieces to the cylinder case, top and bottom.
8. And there you go! An easy and solid pencil case from toilet rolls!

Note: You can decorate the inside with pattern paper if you want to, but I'll leave that up to your creativity

* http://onelmon.com/blog/2013/06/toilet-roll-pencil-case-with-felt/

Pet bed*

What you need:
Tools:

1. Scissors
2. Thread and some yarn
3. Thick sewnig needle
4. Meter
5. Pins (optional chalk and ruler)

Supplies / ingredients:

1. Used hoodie
2. Acrylic blanket or pieces of cloth
3. Cushion filling or a pillow(45cmx45cm)
4. A flap (for closing the sleeves)

1. Turn your sweatshirt inside out. Gather the edges of the collar and sew them with a thread or use a sewing machine if you want it faster. Leave a small piece open.
2. Stretch the hoodie with pins and mark a straight line from one armpit to the other. If you prefer, use a ruler and chalk to mark on the fabric. Sew, joining the front and back of the grid, following the path. Remove the pins.
3. Put the sleeves along the body of the sweatshirt and pin to the sides (as shown on the picture). Leave the cuffs without sewing them.
4. Insert acrylic blanket, foam or even chopped leftover fabrics through the cuffs to form the edges of the bed.
5. Fill the belly of the blouse with cushion stuffing or a pillow.
6. Join the cuffs sewing them together, you can also use the sewing machine if you like.
7. Take one piece of other fabric and put it around the cuffs so that it would cover the sewed part. Sew it with a regular stitch and turn it inwards.

* https://www. handimania.com/diy/sweatshirt-pet-bed.html


1


2


3

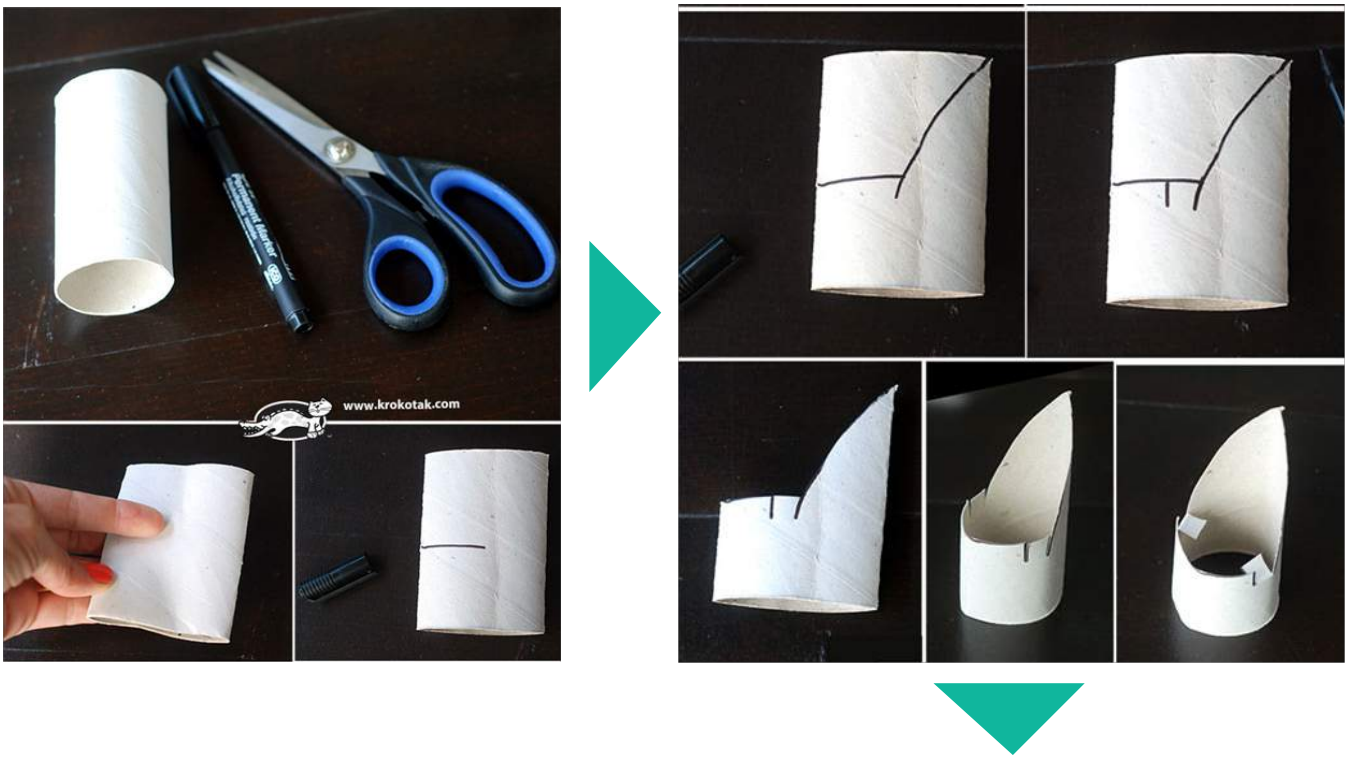

4


5


6


7

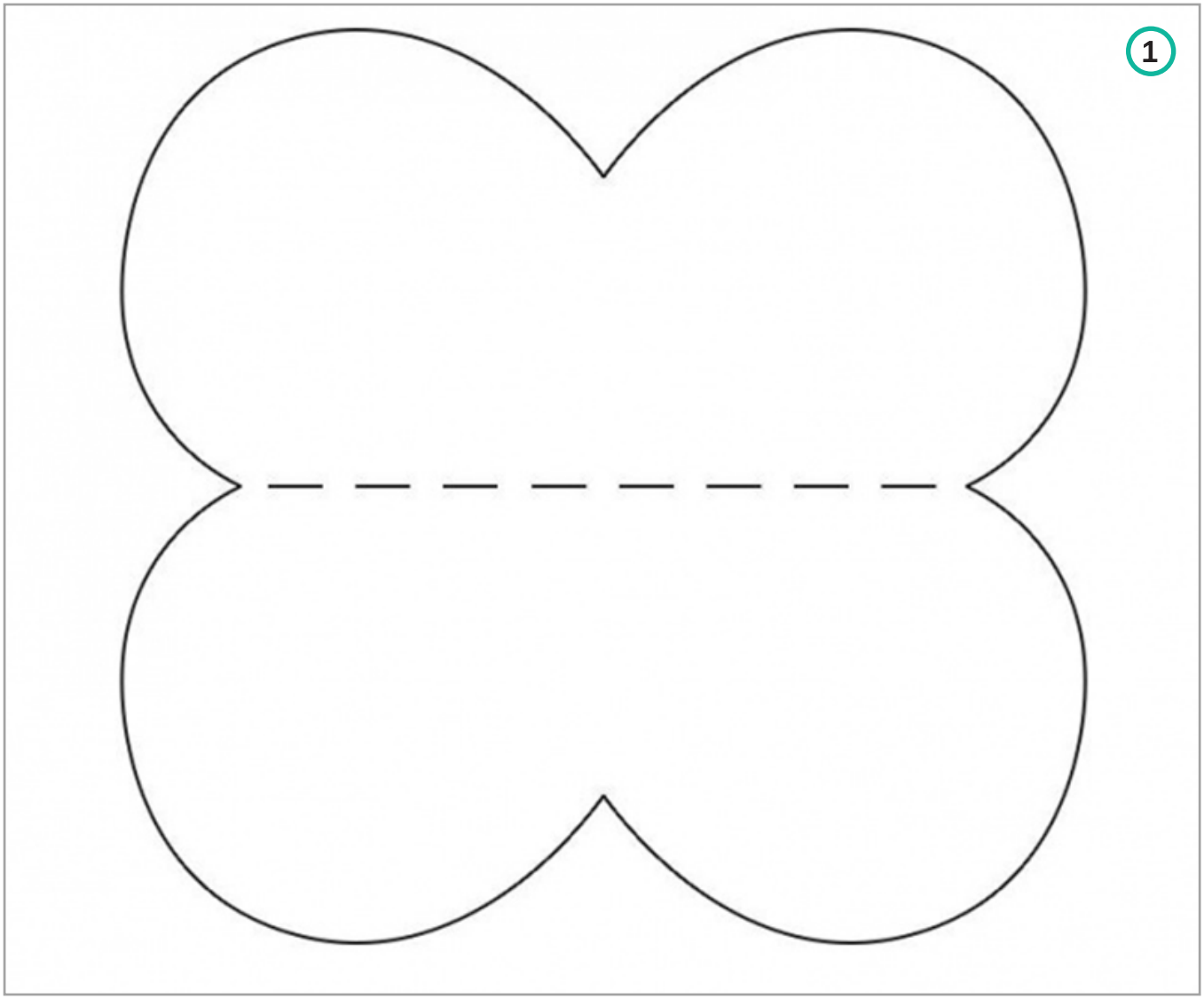
Phone holder*



* http://krokotak.com/2016/07/how-to-make-phone-holder-from-toilet-paper-rolls/

Case for sunglasses*

What you need:
a piece of light cloth measuring 30cm x 30cm, paper, scissors, chalk (instead of this you can also use a marker or anything that leaves a visible mark), a needle, and some thread.



1. The first thing you need to do is print out or trace the template for your sunglasses case (below) onto a piece of paper. The size you need obviously depends on the size of your sunglasses. Once you've done so, cut it out using scissors.
2. Place the template on your piece of cloth, and draw around it with the chalk/marker.
3. Now carefully cut out the template on the cloth. Place your glasses on it to check if it's the right size and make adjustments with the scissors if necessary.
4.Now you need a strip of material about 1cm wide and around 35cm long. You can use the same piece of cloth that you used to cut out the above template, or another piece entirely — it doesn't matter.

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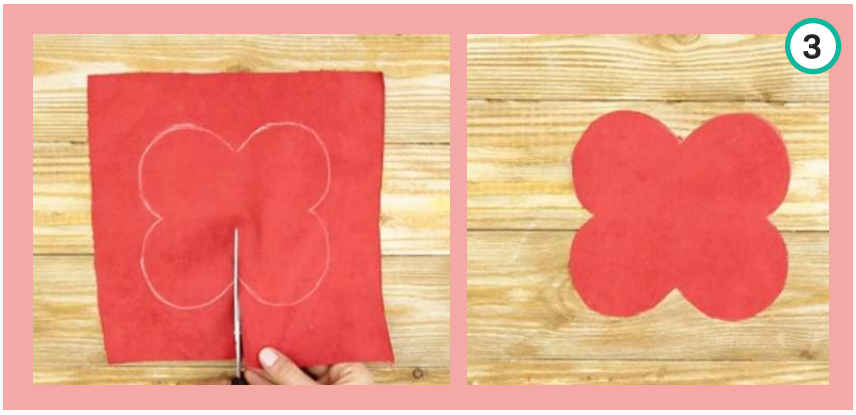
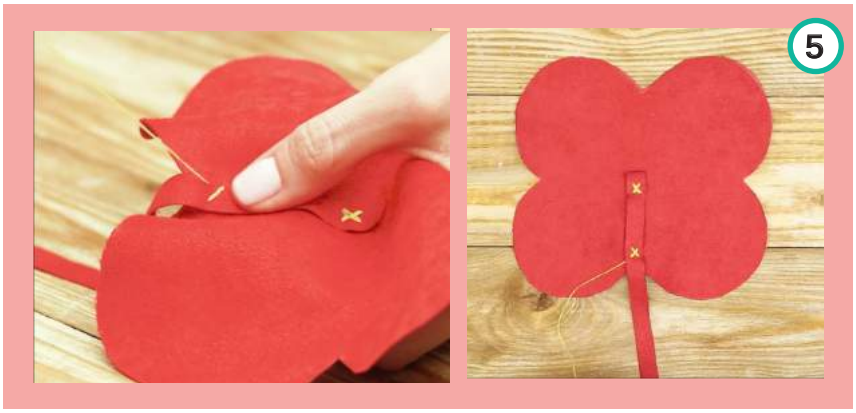
https://brightside.me/video/how-to-make-a-stylish-case-for-your-sunglasses-in-just-ten-minutes-182905/

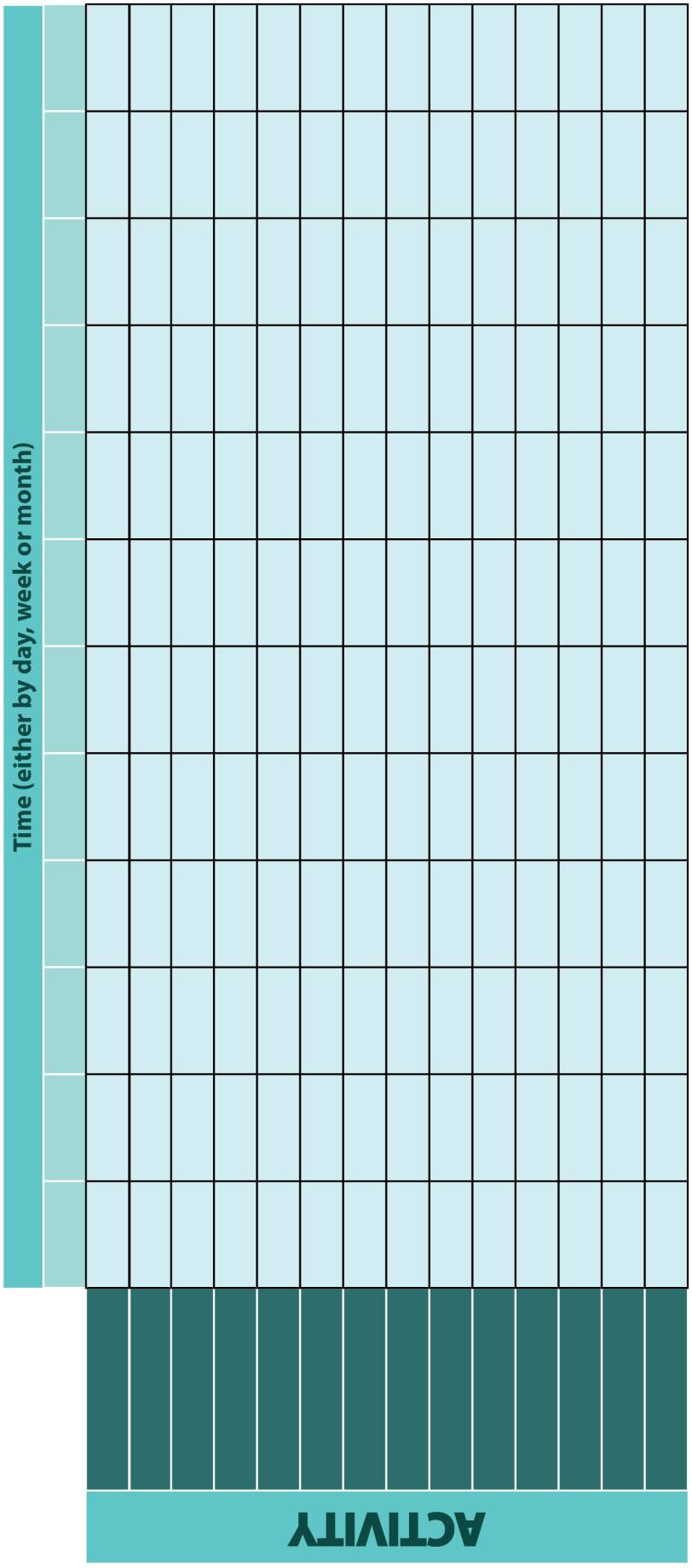
5. Place one end of the strip of material at the center of the template, and sew it in place at two different points with X-shaped stitches, as in the image below.
6. And that's it! If the strip of material is too long, simply shorten it by cutting off a piece at the end.

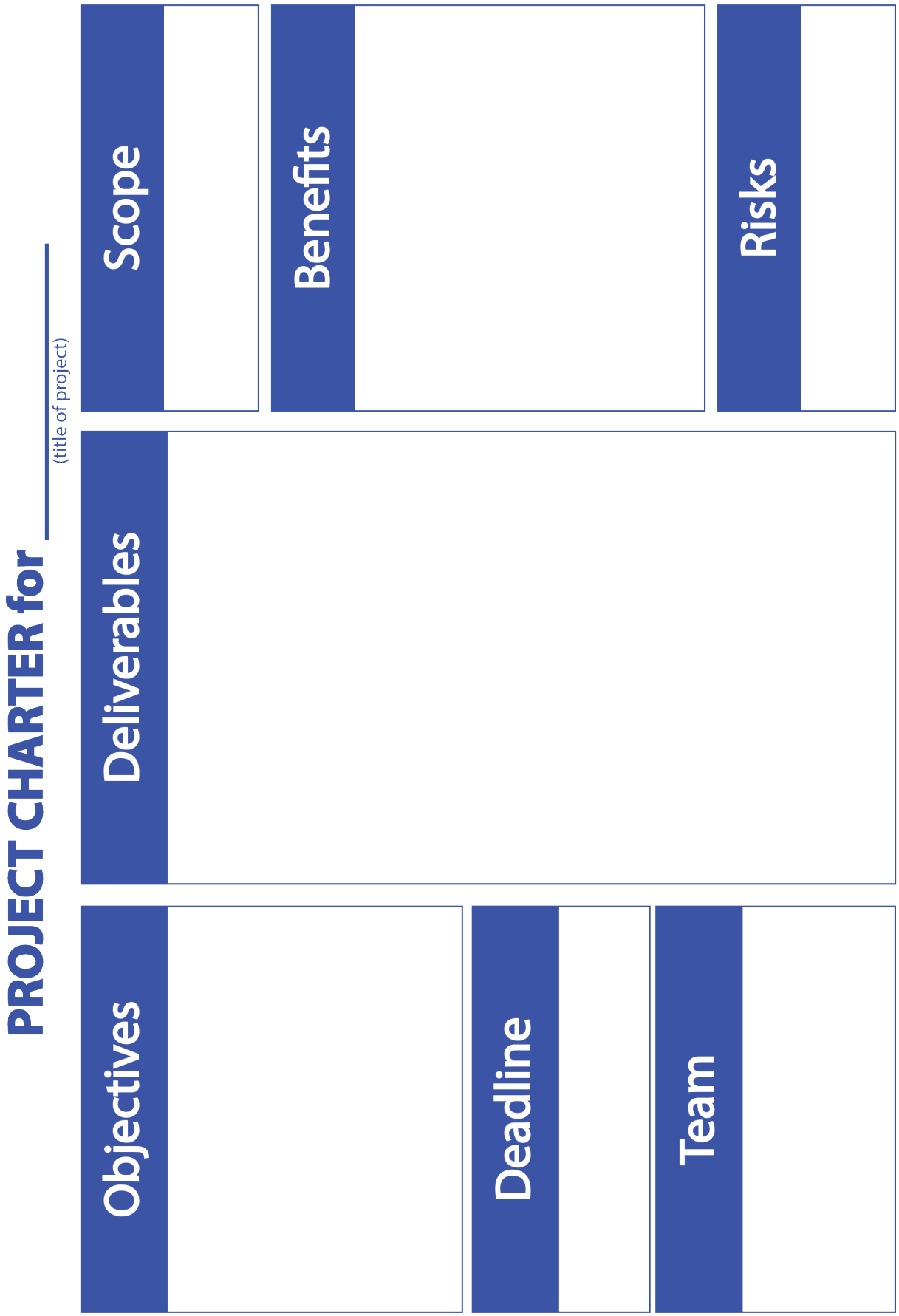




* http://krokotak.com/2016/07/how-to-make-phone-holder-from-toilet-paper-rolls/

GANTT CHART




PROJECT CHARTER for
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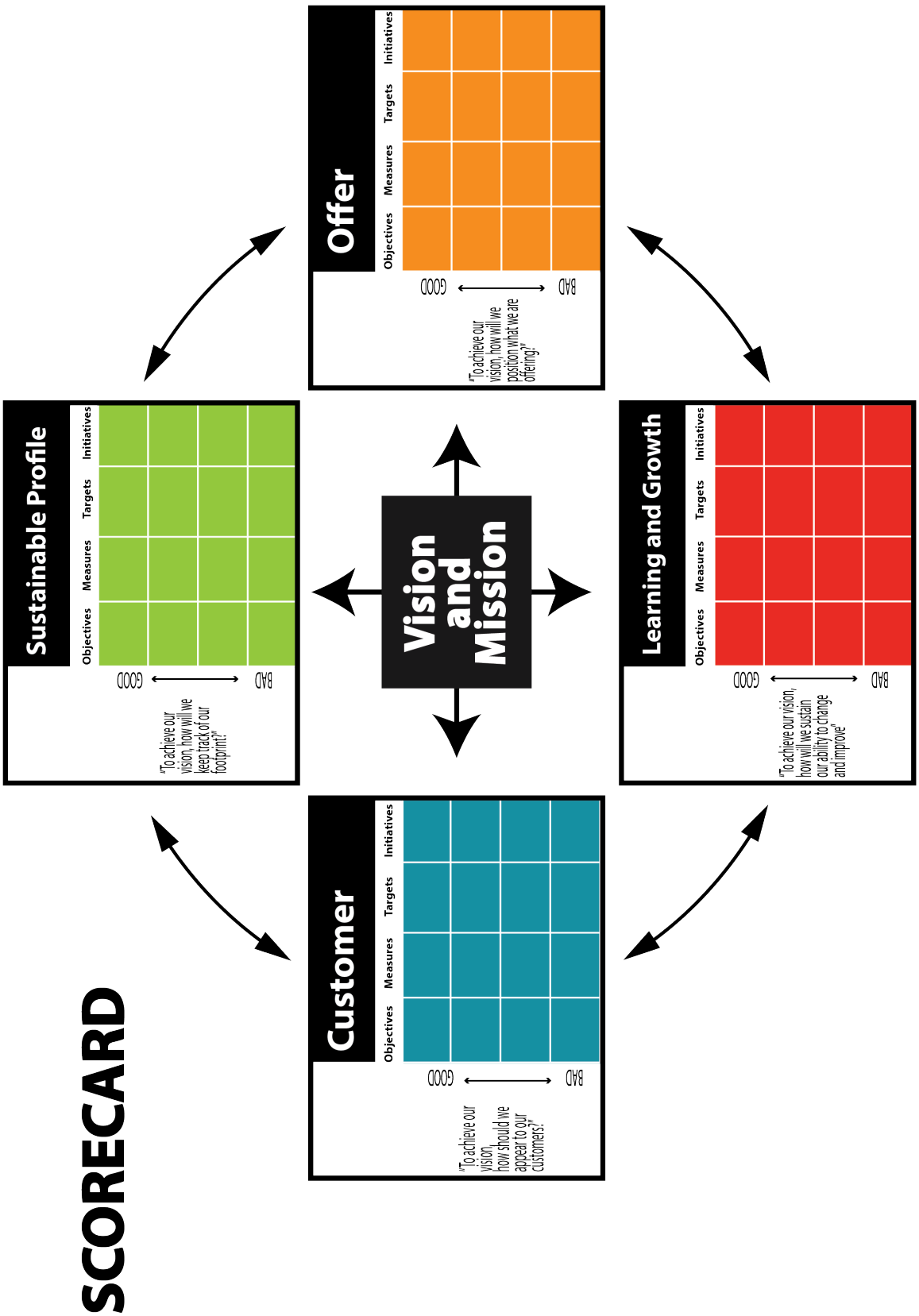
Benefits
Risks
Deliverables
Objectives
Deadline
Team


SCORECARD
Vision and Mission
Offer
Objectives
Measures
Targets
Initiatives
BAD
GOOD
"To achieve our vision, how will we position what we are offering?"
Learning and Growth
"To achieve our vision, how will we sustain our ability to change and improve"
Customer
"To achieve our vision, how should we appear to our customers?"
Sustainable Profile
"To achieve our vision, how will we keep track of our footprint?"