TECHNOLOGY

An introduction to Product Analysis

TOASTER PRODUCT ANALYSIS

- Format

1. Toaster Analysis - PowerPoint Presentation – General Overview
2. Teacher Resource Pack –Detailed project resource sheets in T4 printed booklet format
3. Student Resource Pack –Detailed project resource sheets explaining project stages, providing template sheets and displaying student' exemplar work as reference.

WHAT IS PRODUCT ANALYSIS?

Group Discussion

Why, as designers do we analyse existing Products?

What do we learn from analysing products around us?

Discuss the skills you think a successful designer must have to create innovative designs?

Case Study:

TR: **Adidas Predator Boot**

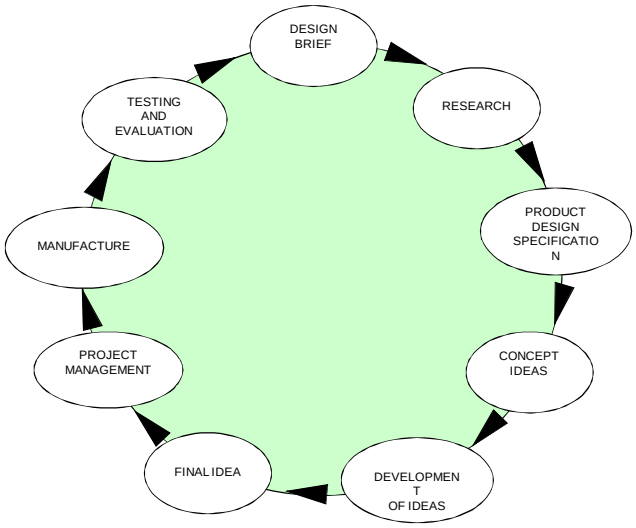
TOASTER ANALYSIS – **PROJECT OBJECTIVES**

This analysis project is an introduction to the area of Product Analysis. It explores the separate stages of The Design Process and investigates how product analysis can affect a design's development. The Toaster Analysis Project develops foundation analytical skills. It explores the stages of The Design Process in detail, linking industry design and manufacturing examples. In conjunction with the standard resources required for a successful product analysis, this project also encompasses an extension module. This allows students to utilise their design and technology knowledge to suggest design modifications.

TOASTER ANALYSIS – Subject Areas Covered

- Introduction to The Design Process, Design Brief and Design Specifications, Design Process, Design Brief, Specifications and introducing Design Constraints
- Introduction to Product Analysis and Evaluation– Thought process and questioning
- Introduction of Key Terms: Function, Aesthetics, Usability, Ergonomics, Target Market
- Focus on Usability and Ergonomics in Design with a group User Testing Task
- Understanding a Toaster's functional and technical components – Establishing cross-curricular links with the Science subjects.
- Introduction to materials used in a Toaster's manufacture and their properties
- Development of observation, visual sketching and presentation skills - Product Analysis Task
- Following analysis, students will participate in a User Trial, testing various toasters and drawing analytical comparisions.
- Development of design and innovation skills – Student will complete a design modification task, creating their own toaster design. Student will write an individual design brief, design specification and annotated sketch design ideas.
- Extension – Produce a prototype model of toaster design
- Assessment and Summative Evaluation Tasks
- Evaluatio - Focus on enhancing student's technical knowledge and verbal communication skills

TOASTER ANALYSIS – A Project Design Cycle



TOASTER ANALYSIS – GROUP DISCUSSION

- Group discussion

  Why are there a multitude of toaster designs on the market? Why is there not just one toaster to suit all?



.....Because the user's needs differ and that is where design is an integral part of the technology process!

TOASTER ANALYSIS – Group Discussion & Observations

Leading an initial group discussion?

- Explain why we analyse products & what we learn from it?
- Introduce the technology of a toaster and the key design, functional and analytical terms
- Pass the toaster around asking each student to make an observation / contribution – focus on communication skills!
- Tailor questions to differentiate student's verbal and academic ability.
- Refer to the Design Cycle and other products during the discussion. This highlights to students that objective of the task is that they can apply these analyticla skills to any product. Focus on the analytical choices they make as consumers.



TOASTER ANALYSIS – Discussion Prompt Questions

- Length / Width of slots: Are they adequate for bread of different types – Bagel, soda?
- Lowering Mechanism: - Ergonomics of the handle, Force required to lower the toast into the toaster, how does this change for younger and older users.
- Browning Dial: Method of adjusting the degree of 'brownness'. Accuracy of 'brownness' setting.
- Design Footprint: size of the toaster – how much space the toaster takes up on the work top.
- Toasting: Can you see the bread toasting during the process? Does the bread toast evenly or do sections of the bread stick out?
- Colour of the outside of the toaster: Why is it this colour, is it part of a set, is the colour conducive to keeping the toaster clean? The materials used for the casing – is it plastic, metal? Type of finish used?
- Graphics: Is the manufacturer's name clearly identifiable? Are the graphics used easy to see, Would the toaster's graphics and icons be understood globally?
- Ease of cleaning the toaster – are there any awkward parts where germs may collect?
- Length of the flex – stability? is it to long, too short, too thick and difficult to wind. Design features to allow unwanted flex to be wound around the bottom of the toaster.

TOASTER ANALYSIS – Design / Feature Key Terms

Form / Aesthetics

Function

Features

Handle - Ergonomics

Grates

Crumb Tray

Browning Dial

Graphic Icons

Feedback

Design Footprint

Weight

TOASTER ANALYSIS – Technology Key Terms

Mica Sheets

Nichrome Wire

Electrical Resistance

Radiant Heat

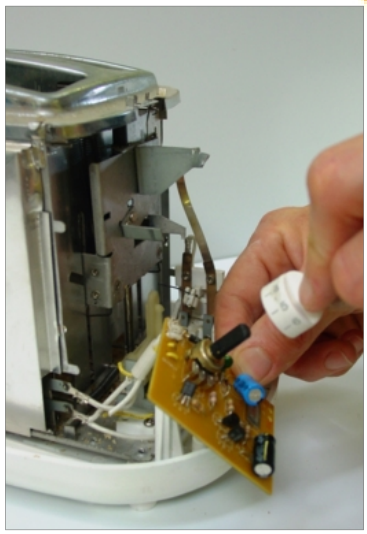
Spring Loaded Mechanism

Electronics

PCB Board

Polycarbonate

Stainless Steel



TOASTER ANALYSIS – How to analyse and evaluate

3 Step process

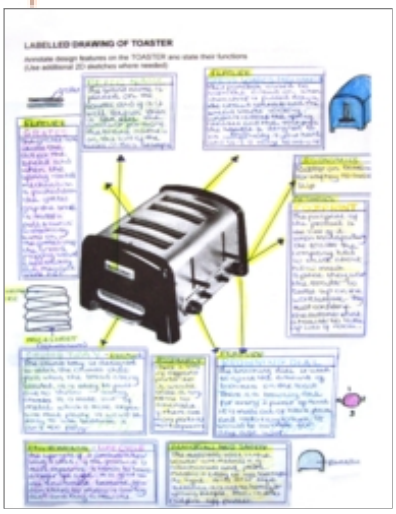
1. **ANALYSIS:** **Describe** the features, technology, usability
2. **EVALUATION:** Give your **Opinion**, Consider various users, situations, budgets and environments
3. **MODIFICATIONS:** If you were to redesign this product, suggest/sketch areas you might possibly change and why?

TOASTER ANALYSIS – Areas & Definitions

- **Function**: What the product is designed to do
- **Target market:** Group of people the product has been designed for.
- **Aesthetics / Form** : The design and style of the product.
- **Features:** Controls, Mechanisms and Feedback Systems
- **Ergonomics / Usability:** Comfort, User Needs & User Abilities
- **Materials:** Research Materials & Fit for purpose?
- **Manufacture / Assembly:** Production, Disassembly & Standard Components
- **Quality:** Finish, Durability, Performance
- **Technology:** Research Technology, Electronics, Innovation
- **Competition:** Market Comparison, Product's strengths and weaknesses?
- **Cost:** Is the product, value for money?
- **Environmental Aspects:** Sustainability / Environmentally friendly?
- **Product Life Cycle:** Recycling, Carbon Footprint

SR: Student Analysis Key Terms / Subheading

TOASTER ANALYSIS – Product Analysis Task



SR: Student Analysis Template Sheet – No Image
SR: Student Analysis Template Sheet – Image Inserted
TR: Toaster Images for Analysis Task

TOASTER ANALYSIS – User Trial & Testing

Objective:
Student participate in a toaster user trial and tasting session.
Students should understand and experience the functional and aesthetic differences in toaster design.

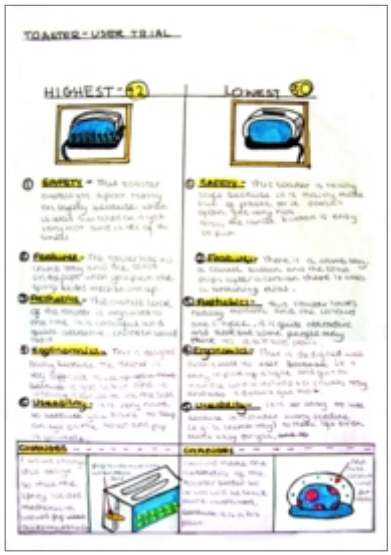
Equipment
The room is set up with several different toaster, which students work through the toasting process, commenting on: the user controls, safety, degree and evenness to which the bread is toasted, key features and usability/ ergonomics.

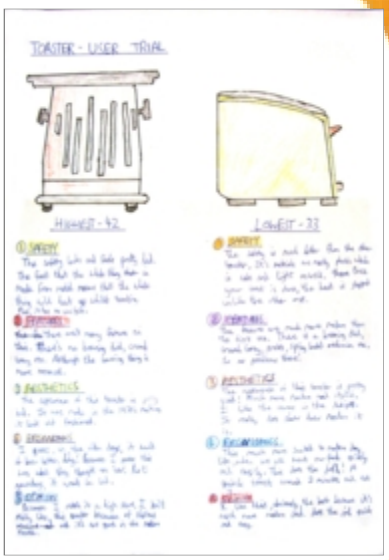
Resources:
User Trial Sheet with prompt questions and tally chart

Task:
Complete a tally sheet and Summative Evaluation Sheet under the following headings: Features, Aesthetics, Usability/ Ergonomics, Safety and Design Modifications.

SR: User Trial Template Sheet

TOASTER ANALYSIS – User Trial Written Task





SR: User Trial Evaluation Template

TOASTER ANALYSIS – Design Modifications Extension

TOASTER ANALYSIS – Design Modifications Extension

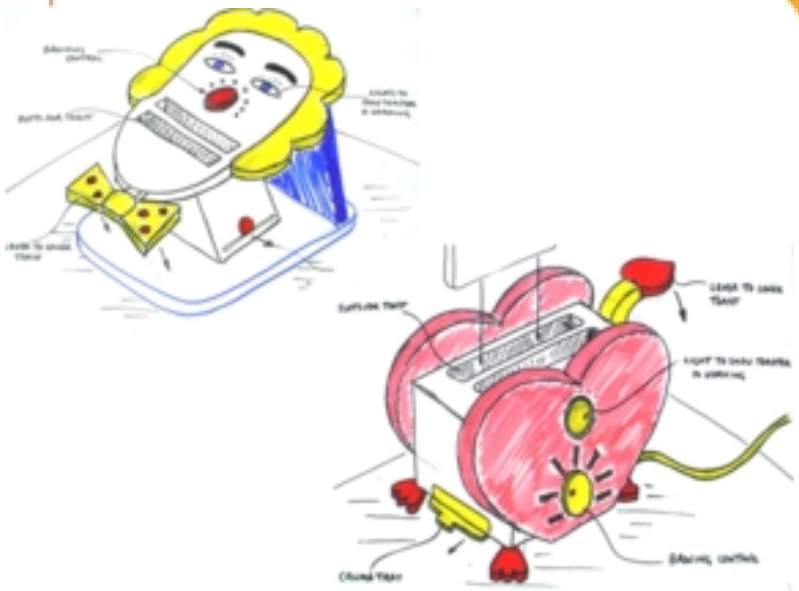
Group Discussion

- Now that students have fully anlaysed the toaster and understand the key components they can now address features for redesign and modification. Refer to the Design Cycle
- How could the toaster design be changed / improved to enhance the product?
- Address features/ areas which you feel do not work as well as they could?
- Remember Design is not always about adding, often products need to be simplified to make them more marketable...think about the success of the ipod against other MP3 players!

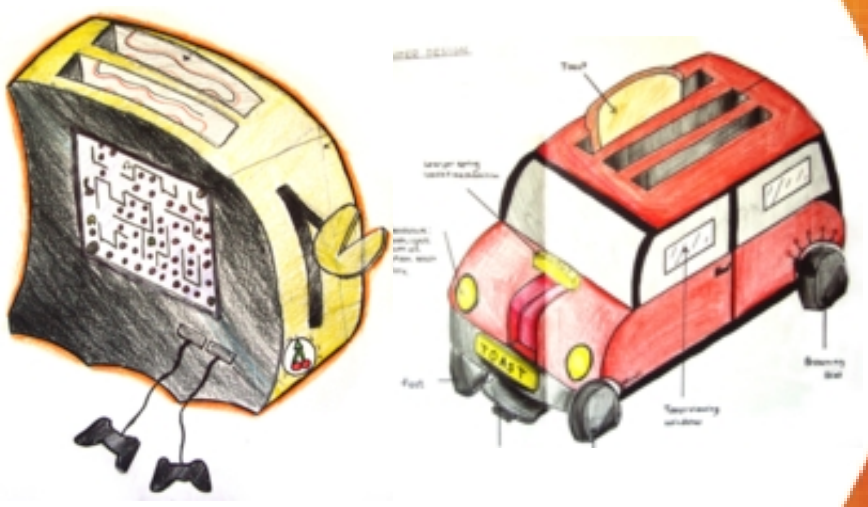
Steps to Redesign:

- Decide on a target Market and a Theme or Focus
- Draft a list of design specifications as a guideline – These define the creative boundaries and student ideas are easier to manage and contain.
- Write an individual Design Brief – This sets a clear objective and tighter boundaries to design within.
- When sketching, start off with an isometric crating and then expand by adding and subtracting surfaces.
- Ensure all sketches are presented to a high standard, clearly labelled and rendered.
- Remember.....Design is centered on clear communication of ideas!

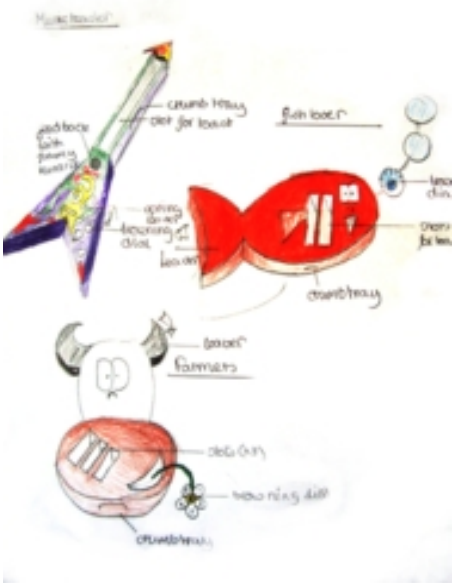
TOASTER ANALYSIS – Sketch Design Modification

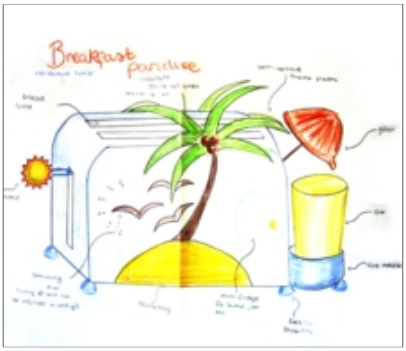


TOASTER ANALYSIS – Student Sketch Design Examples



TOASTER ANALYSIS – Student Sketch Design Examples





TOASTER ANALYSIS – Practical Modeling Examples

Equipment

Styrofoam – Extruded Polystyrene – Blue/ Pink Foam

Supplier - Modelling Offcuts, 600 * 600 sheet x 25/50mm

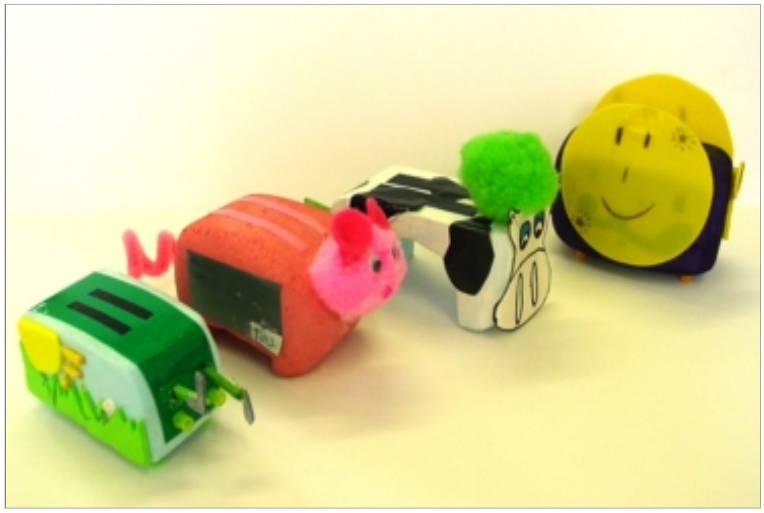
Need Contact Adhesives – UHU (PVA will only set when the two elements are exposed to the air)

Shaping - Selection of Rasps, Files, Glass Paper

Decoration – Vinyl (Offcuts), Beads, Craft Accessories

* Caution when using hot glue guns with Styrofoam, even the belt sander – emits toxic fumes – ventilation, mask*

TOASTER ANALYSIS – Practical Prototype Examples



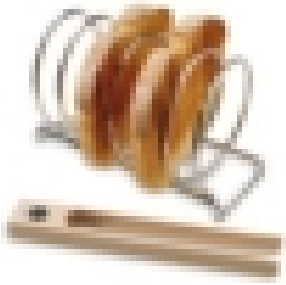
TR: Student Modelling Examples

SR: Design Modification, Specifications & Final Design Template

TOASTER ANALYSIS – Lesson Starter

LESSON STARTER

SKETCH 8 ALTERNATIVE WAYS TO TOAST A SLICE OF BREAD……..



4 IDEAS WITHOUT USING ELECTRICITY……..

TOASTER ANALYSIS – Lesson Starter

TOASTER ANALYSIS – Final Evaluation & Assessment

SR: Student' Assessment Sheet
– Recap analysis' knowledge, skills & understanding

SR: Student' Summative Evaluation Sheet
- Recap project objective, development & project targets
- Teacher Assessment Section & Grade Boundaries

TOASTER ANALYSIS – Additional Information

FOR A COLLECTION OF TOASTER BRANDS AND IMAGES
http://www.pricerunner.co.uk/s/69/compare-Toaster-prices

http://www.amazon.co.uk – Search Toasters

http://www.toastercentral.com/ - (Vintage Toaster Designs)

TOASTER TECHNOLOGY AND INFORMATION
http://www.toaster.org/ - (Avid Toaster collector and enthusiast)

http://www.howstuffworks.com/toaster.htm
(Technical information and animations but copywrite protected)

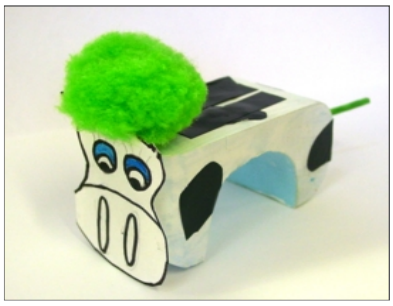
http://inventors.about.com/library/inventors/bltoaster.htm -(History of Toasters)

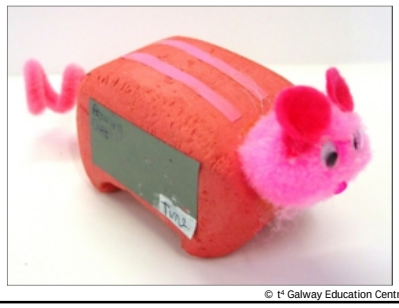
http://en.wikipedia.org/wiki/Toasters

TECHNOLOGY

TOASTER ANALYSIS - MODELLING EXERCISE IMAGE BANK

Toaster Analysis – Student Modelling Examples

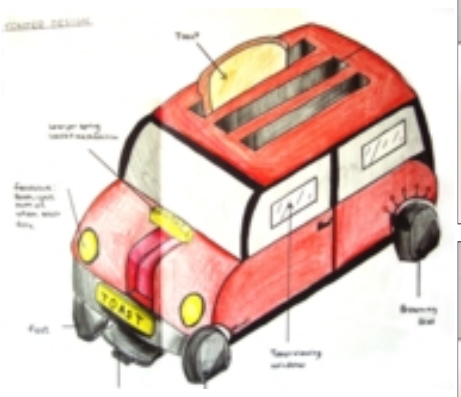


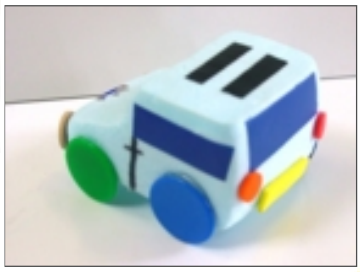


Timeline:
1 Design, 2-3 Lessons Practical

Materials:
Poystyrene Modelling Foam
Variety of Rasps & Files
PVA, Glue Guns
Vinyl, Craft Knife, Cutting Mat
Staining / Paint
Modelling accessories - Beads

Toaster Analysis – Student Modelling Examples



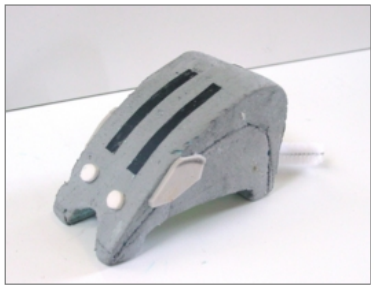


Toaster Analysis – Student Modelling Examples

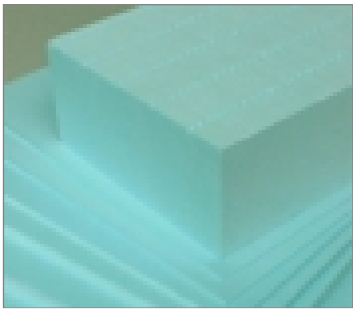


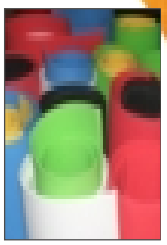

Toaster Analysis – Student Modelling Examples





Toaster Analysis – Modelling Equipment / Resources





Styrofoam / Extruded Polystyrene / Blue Foam, UHU Adhesive, Selection of Rasps, Files, Glass Paper, Vinyl, Beads, Various Craft Accessories