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| **Market research on colour and mood** |
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| Design a questionnaire to help inform your product design |
| **Subject(s):** Science, Mathematics**Approx time:** 45 mins  |  | **Key words / Topics:** * evidence
* reliable
* questionnaire
* psychology
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| **Suggested Learning Outcomes** |  |  |
| * Be able to explain if the relationship between colour and our mood could be proven scientifically
* To be able to design a questionnaire which will generate scientific evidence to prove a hypothesis
* To consider how much evidence scientists need to prove that a hypothesis is correct
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| **Introduction** |  |  |
| The engineers behind the Watt Nightclub in Rotterdam turn the energy created by clubbers on the dance-floor into power for the lighting. There’s even a giant battery to monitor the energy and encourage the crowd to dance even more. Doing your bit for the environment doesn’t have to be boring!One of the options that the designers had to consider was the colour of the lighting on the dance-floor. In this short but challenging activity, students plan an investigation into whether the colour of the lighting may affect the amount of electricity generated on the dance-floor. |
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| **Activity** |  | **Teacher notes** |
| Pose the question:**‘Can it be scientifically proven that colour affects your mood**’Discuss with pupils their views on this statement, and how they might go about collecting some evidence to support or refute these ideas.Discuss as a class how researchers use questionnaires to collect evidence.* What makes a good questionnaire?
* What things do they need to think about when designing and carrying out a questionnaire?

A black and white logo  Description automatically generated Watch the **Dance Power** film (as the survey relates directly to this technology).Class is split into groups and challenged to design a questionnaire that will provide enough evidence to answer:* **Will the colour of the light created on our dance floor affect the amount of electricity that can be generated? (i.e. will the colour affect the mood of the people in the club, causing more to dance or causing more vigorous dancing)**
* **Which colours, if any, would be the best to choose if we wanted to make the most electricity?**

Test the questionnaire with one or two people in the class. Evaluate their questionnaire; are there any changes they would make?Discuss with the class how many responses they will need to be confident about the evidence they have collected.Students to conduct the questionnaire for homework. They need to note down any problems they experience when carrying out the questionnaire.Once the questionnaire has been carried out, students should process and present their findings. These need to include:* Their results
* Their conclusions
* Any problems they have encountered
* How reliable/accurate their findings are and why

Each group shares their findings with the class, outlining which colour combination they think will create the most electricity and the reasoning behind their decision.Discuss with the class * Do they think there is a link between mood and colour
* The reliability and accuracy of the evidence they collected
* The effectiveness of questionnaires as a tool to collect evidence
* The problems they found with using questionnaires as a method for collecting evidence
* Whether they considered the make-up and size of their sample when they carried out the questionnaire, and is this important?
 |  | This could use the research from the  **Colour in Product Design (Activity)** , or you may wish for students to collect some background information into people’s views on the psychological effect of colour. (Types of answers the questions generate and how easy is it to compile results from these answers, e.g. yes or no answers or comments, or a sliding scale of 1–5)This sets the scene to a night club that produces energy/electricity by the movement of the floor when people dance. To increase the amount of electricity produced, either more people should dance or they should dance more enthusiastically.This could link back to outcomes of earlier discussions for what made a good questionnaire. |

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| **Differentiation** |  |  |
| **Basic** |  | **Extension** |
| Provide models of a similar questionnaire and the analysis of the responses (bar charts, pie charts or similar).Use a writing frame to support the development of questions for the questionnaire. |  | Less structure and advice on the format and contents of the questionnaire; increased identification of social groupings within the questionnaire, and an explanation of how the data could be used to identify different requirements between these groupings |
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| **Resources** |  | **Required files**  |
| * Access to a computer and projector
 |  |   Colour in Product Design (Activity) |
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| **Additional websites** |  |  |
| * <https://www.infoplease.com/color-psychology> Do different colours affect your mood? By David Johnson
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| **Related activities (to build a full lesson)** |  |  |
| **Starters** (Options)* FILM: Dance Power

**Main** (Options)* ACTIVITY: Piezoelectric Crystal
* ACTIVITY: Piezoelectric Product
* ACTIVITY: Electric dancefloors
 | **Extension** (Options)* ACTIVITY: Colour and Feelings
* ACTIVITY: **Market research on Colour and Mood**
* ACTIVITY: Colour in Product Design

**Plenary*** Cross-curricular presentation of learning: poster with agreed assessment success criteria
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| **The Engineering Context** A black and white logo  Description automatically generated |
| * **The story** Dance Power Film
* **How it works?** Tile Prototypes
* **Who makes it work?**  Dr Helm Jansen and Dr Johan Paulides
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| **Curriculum links and PLTS** |
| **England**Science * KS3 1a, 2a, 2e, 2f, 3b, 3c, 3e, 3f

Design & Technology* KS3 1a

Mathematics* KS3 1e, 1g, 2a, 2d, 2e, 2g, 3c, 4o, 9a, 9b
 | **Northern Ireland**Technology & Design* Design – identifying problems; investigating, generating, developing, modelling and evaluating design proposals; giving consideration to form, function and safety

(Objective 2) Developing pupils as Contributors to Society* Cultural understanding

Learning Outcomes* Research and manage information effectively to investigate design issues, using Mathematics and ICT where appropriate;
* Show deeper understanding by thinking critically and flexibly, solving problems and making informed decisions, using Mathematics and ICT where appropriate;
* Work effectively with others;
* Communicate effectively in oral, visual (including graphic), written, mathematical and ICT formats showing clear awareness of audience and purpose.
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| **Scotland**Technologies* TCH 3-01a, TCH 3-07b
 | **Wales**Design & Technology**>** 4.1, 4.2, 4.4, 4.5, 4.7 |
| **GCSE D&T**AQA D&T* 3.1.1, 3.1.2, 3.2.1, 3.2.3, 3.3.1, 3.3.2, 3.3.6

Edexcel D&T* 1.1.3b, c, 1.1.7, 1.2.4b, 1.3, 1.15.1h, 2.3.1b, 3.3.1b, 3.3.6c, 4.3.1b, 4.3.6c, 5.3.1b, 5.3.6c, 6.3.1b, 6.3.6c, 7.2.5b, 7.3.1b

Eduqas D&T* 2.1 Core: 1, 3
* 2.1 Systems: 2
* 2.2 Core: 2, 4

OCR D&T* 1.2a iv, 2.1 a vi, 2.2a, 3.1a iv, 3.3a i, 5.2c ii
 | **GCSE Engineering****AQA Engineering*** 3.1.3
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| **GCSE Science**AQA Combined Science Trilogy* 5.10.2.2, 4.1.3

AQA Combined Science: Synergy* 4.4.1.5, 4.8.2.4

Edexcel Combined Science* Chemistry: 8.26, 3.13

Eduqas Combined Science* 2.2: 12g
* 2.3: 1.2f

OCR Gateway Science: Combined Science A* C6.2e
* P8.2a

OCR 21st Century Science: Combined Science B* C1.3: 4
* P2.2: 1, 2, 3
 | **GCSE Chemistry**AQA Chemistry* 4.10.2.2

Edexcel Chemistry* 8.26

Eduqas Chemistry* 12g

OCR Gateway Science: Chemistry A* C6.3e

OCR 21st Century Science: Chemistry B* C1.3: 4
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| **GCSE Physics**AQA Physics* 4.1.3

Edexcel Physics* 3.13

Eduqas Physics* 1.2f

OCR Gateway Science: Physics A* P6.2a

OCR 21st Century Science: Physics B* P2.2: 1, 2, 3
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| **Assessment opportunities** |
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| **Personal, learning & thinking skills (PLTS)** |
| **>** Creative thinker |