Hampshire County Council
Improvement and Advisory Service

HIAS OPEN RESOURCE

Introducing students to features of text types within your subject area

Supporting all readers in the secondary school

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Final version

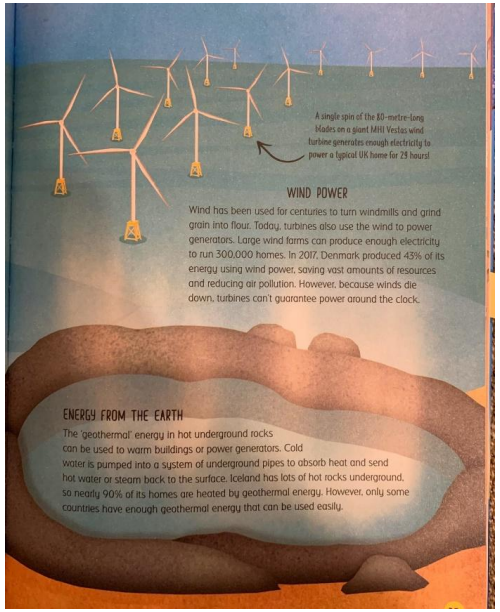
Overview

This document contains…
Slides that could be used as part of a CPD sequence for teachers in school, supporting understanding of reading in secondary schools

Points to consider when using this resource
The resources in this series are intended as a companion piece to the DfE's series of training videos and guidance *Supporting all readers in secondary school*, providing additional detail. This resource expands on ideas shared in video 5, *Identifying text features* and provides links to research.

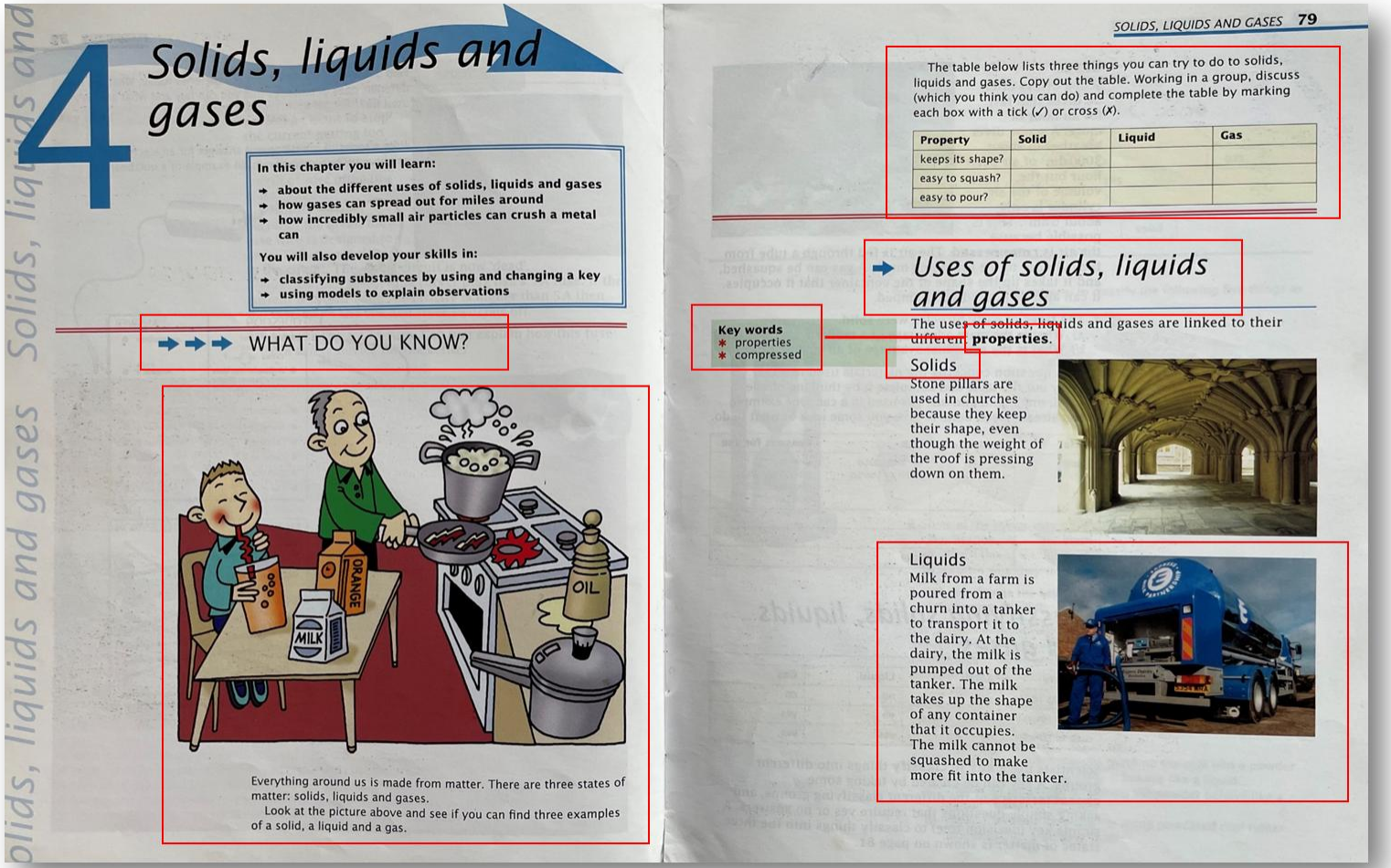
Connect to experience of similar texts

- Presentational features
  - Use of images, graphic organisers, colours and font choices
  - Visual sequencing – what do you look at first and last?
- Organisational principles
  - Headings and subheadings
  - Bold and italics for key terms
  - Relationship between text and images
- Expectations – the contract between the reader and the writer
  - The writer provides enough information for the reader to make sense of the information; the reader perseveres to find the information



Are students familiar with the conventions of your subject's textbooks?

- Don't assume that all students have used textbooks in the form or for the purposes that you might use them in Year 7
- Spend some time talking them through features that might seem obvious, such as:
  - On this page, you can see the heading 'Uses of solids, liquids and gases' followed by subheadings for 'solids' and 'liquids', meaning that 'gases' is on the next page (primary pupils are very used to double-page spreads)



4 Solids, liquids and gases

In this chapter you will learn:
- about the different uses of solids, liquids and gases
- how gases can spread out for miles around
- how incredibly small air particles can crush a metal can

You will also develop your skills in:
- classifying substances by using and changing a key
- using models to explain observations

WHAT DO YOU KNOW?

Everything around us is made from matter. There are three states of matter: solids, liquids and gases.
Look at the picture above and see if you can find three examples of a solid, a liquid and a gas.

SOLIDS, LIQUIDS AND GASES 79

The table below lists three things you can try to do to solids, liquids and gases. Copy out the table. Working in a group, discuss (which you think you can do) and complete the table by marking each box with a tick (✓) or cross (✗).

Property	Solid	Liquid	Gas
keeps its shape?			
easy to squash?			
easy to pour?			

Uses of solids, liquids and gases

Key words
* properties
* compressed

The uses of solids, liquids and gases are linked to their different **properties**.

Solids

Stone pillars are used in churches because they keep their shape, even though the weight of the roof is pressing down on them.

Liquids

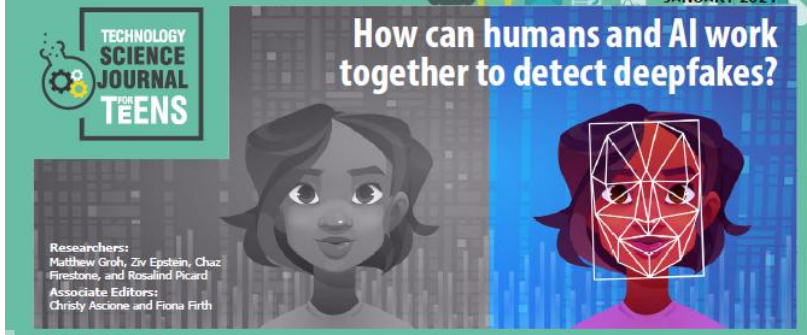
Milk from a farm is poured from a churn into a tanker to transport it to the dairy. At the dairy, the milk is pumped out of the tanker. The milk takes up the shape of any container that it occupies. The milk cannot be squashed to make more fit into the tanker.

Features such as **chapter previews, chapter summaries, fact boxes, use of bold and italics to highlight key words, illustrative images** etc are useful in supporting understanding of the material in the chapter. However, some students are likely to think that they can use just these features to avoid reading the rest of the content. Model reading the whole text!

TECHNOLOGY SCIENCE JOURNAL FOR TEENS

JANUARY 2024

How can humans and AI work together to detect deepfakes?



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Abstract

Fake news is not new on the internet, and people often change images and videos for a joke. However, deepfakes aren't only meant to make you laugh. Instead, they can spread misinformation or discredit a person or a group. As more deepfakes find their way onto the internet, we need to find the best way to detect these harmful videos. We tested whether the leading AI model or humans were better at detecting deepfakes online. We found that humans and the AI model were each good at identifying certain types of deepfakes. Maybe we could merge the abilities of both AI and humans to create the best deepfake detection model!

Introduction

Imagine you are watching a video online of your favorite celebrity and they say something very offensive. You might be shocked, or maybe even angry. But you have a feeling that something is wrong with this video – and it turns out it's a **deepfake**.

For a long time, video evidence has been the best way of indicating whether someone did or said something. Unfortunately, the rise of deepfakes means that is no longer the case. Deepfakes are videos that show people saying or doing things that didn't really happen. These videos are created by an **artificial intelligence (AI)** system based on **deep learning** – leading to the name deepfake. There have been a handful of deepfakes that have gone viral in the past few years. These include videos of well-known figures like Barack Obama, Donald Trump, and Mark Zuckerburg saying things they didn't say. But can we tell the difference between real and fake videos that we see online?

Engineers have trained **machine learning** models to try to identify deepfakes on the internet. However, the best known model can only detect deepfakes with around 65% accuracy. We wanted to know whether humans or the latest machine learning model were better at detecting a deepfake. We also wanted to see if human emotion plays a role in our ability to tell what's real and what's fake.

We then used our results to suggest how best to detect deepfakes online!

Methods

We designed a website called *Detect Fakes*, where anyone could view deepfake videos. We used this site to test how accurately ordinary people could detect a deepfake. Most of the videos were of unknown people making unimportant statements. That was to make the experiment more equal between humans and the machine learning model.

We conducted two experiments:

→ **Experiment 1** – One real and one fake video side by side

All participants in this experiment found the site while browsing. They watched a deepfake video alongside its corresponding real video, and we then asked them to choose which one was fake. There were 56 pairs of videos. We examined the accuracy of 882 participants who watched at least 10 pairs of videos (Figure 1). The machine learning model assessed all 56 videos.

→ **Experiment 2** – One real or fake video

We had two kinds of participants in this experiment: people we recruited and people who found the site while browsing. We focused on participants who had viewed at least 10 videos. In total, there were 301 recruited participants and 1,879 non-recruited participants.

Our recruited participants started the assignment with a writing exercise. Half of them just had to write about their day. The other half had to write about things that made them angry. This was to test how emotion impacts decision-making. They then watched the videos.

All participants were shown one video at a time. They had to share how confident they were, from 50–100%, that the video was real or a deepfake. The videos we used included four videos of Kim Jong-un and Vladimir Putin, two of which were fake. We then showed participants what the model predicted and allowed them to change their answers. This way we could see whether human decision-making was impacted by machine predictions. The machine learning model assessed 50 videos from a **dataset** of 4,000 videos.

In both experiments, we included **interventions**. These included **obstructed** faces and inverted videos – videos shown upside down. We did this to see if the way our brain naturally recognizes faces changes our ability to identify a deepfake.

Figure 1:
Here are two images used in Experiment 1. One of these images is from the original video and one is from the deepfake. We asked the participants to identify which of these two videos was the deepfake. Can you guess which image is the deepfake? Image: PNAS, CC BY-NC-ND

Results

→ **Experiment 1**

The leading machine learning model correctly identified 65% of the videos in the dataset (Figure 2).

82% of participants outperformed the machine learning model.

Participants were better at detecting fakes in high-quality videos. When the video was inverted or of low quality, they were 5% less accurate.

→ **Experiment 2**

Recruited participants identified deepfakes 66% of the time.

Non-recruited participants identified deepfakes 72% of the time.

Please see Figure 2 on page 3

The leading machine learning model correctly identified 80% of videos when shown 50 videos from the dataset.

When shown the entire dataset of 4,000 videos, the model achieved 65% accuracy.

Participants who wrote about things that made them angry were quicker to judge a real video as a deepfake.

The machine learning model was better at detecting low-quality deepfakes such as grainy, blurry, and inverted videos.

Participants were more likely to change their answer if it was different to the model's answer. This usually made them more accurate, except in the case of the political leader videos. The machine learning model was incorrect about both real videos of the political leaders. Meanwhile, 64% of participants correctly identified the videos of political leaders.

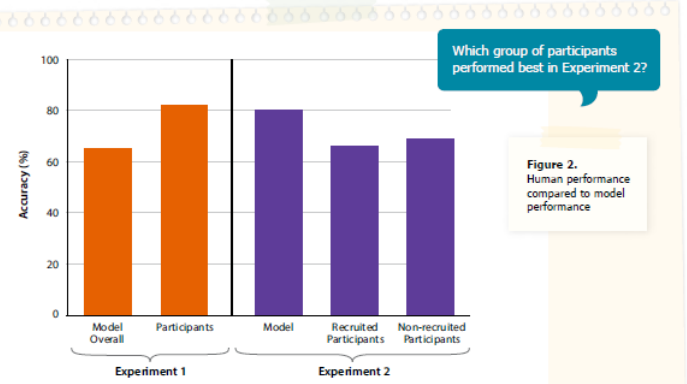

Figure 2.
Human performance compared to model performance

Discussion

Our results suggest that people are as good at identifying a deepfake as the leading machine learning model. Participants were better than the model when it came to the four videos of Kim Jong-un and Vladimir Putin. This could be because we can think critically about the content beyond the visual clues. The machine learning model was pretty certain that the authentic videos were deepfakes. This leads to questions about the model's ability to analyze the context of a video.

Emotion does seem to impact human decision-making by decreasing our accuracy. Therefore, deepfakes that provoke emotion may be harder for us to detect.

In Experiment 2, participants could change their initial answer after seeing the model's response. This helped participants improve their accuracy in most cases. However, it also led them to change their correct answers. This suggests that human-machine collaboration might not lead to more accurate results.

Conclusion

The good news is people appear to be good at detecting deepfakes. The bad news is that deepfakes will likely get more difficult to detect over time. However, we can take action. Humans are better at thinking critically about the content and context of the video. Always think before sharing viral videos, especially if they make us angry or upset! We can tell our friends and family to be careful, too.

This scientific article aimed at teenagers can be used to familiarise students with the structure of a science paper, including the abstract, methods, results, discussion and conclusion. This is a more important text type for students to read in science than (for example) biographies of famous scientists.

Text-type features to explore

- How to interpret data from tables, graphs and grids, and how to connect this data to the written content
- How to follow step-by-step information, particularly when this information is combined with description and commentary, as in some recipes or instructions
- How to use indexes, glossaries, summary boxes, annotations of images, maps
- How to distinguish facts and opinions, and how to connect these to the context within which they are written or expressed
- How to connect information from different sections of the page/s

HIAS English Team

Please contact Joanna Kenyon Joanna.Kenyon@hants.gov.uk for support with secondary reading, whole school literacy and English.

For further details on the full range of services available please contact us using the following email: htlcdev@hants.gov.uk

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