11-14 Work Done

Prerequisites

Students should have already completed the **Energy Stores** sheets.

The Main Points

- **Mechanical** Energy transfer occurs when a **force does work** by moving something or causing a change.
- **The work done** can be quantified by Work done = force x distance, W = F x s.
- The unit of work is the **Joule (J).**
- Not **all** forces lead to work being done.
- For a given system, energy is conserved, this is called **conservation of energy.**

Teacher Quarter Briefing

- Introduction: coming soon
- Practice: https://isaacphysics.org/gameboards#teach_quart_work_done
- Review: coming soon
- If you want to go further: https://isaacphysics.org/pages/covid19_gcse_archive#33

Class Question Notes

The worksheet can be printed either in full, or in cloze text form (where the red text is missing, and students can complete these blank spaces after class discussion). The online version of the notes requires the appropriate text to be dragged to the right place in the sentences.

1. This question is getting the students to see the pattern with the equation of Work done = F x distance. The more balls you lift onto a table the greater the force.
2. This question is a multiple choice question. This question is about getting students to think about which forces do work and which don't. The force must have moved or changed an object by a certain amount to do work.
3. Another multiple choice question. All parts have the same choices, ie has the energy store stayed the same, increased or decreased? This question is trying to highlight how energy is transferred from one store to another, and how work plays a role in this. Energy should be conserved in this case.
4. In this question, the student rearranges the amount of work that has been done in decreasing order. This should help develop their familiarity with the work done equation.
5. This question is similar to question 3. In this one, a lorry travels up a hill at a steady speed, so the kinetic energy doesn't change, but the potential energy does.

6. This question is about pulling bricks up to a certain height. It is numerical. It encourages students to complete the pattern to solve the problem.
7. This is another numerical question. A little more challenging. Students need to first find the total force before finding the work done.
8. A numerical question. This question is about getting students comfortable with the equation for work done and how in reverse situations, it is the same.

Homework Question Notes

These questions have a very similar form to the questions in the class task, so students can refer back to their earlier answers to help

1. Again this question is about getting the students to think about the types of forces that do work.
2. This question is another multiple choice question getting students to think about how force affects the work done on an object and how it transfers to energy stores.
3. This question is numerical and is getting students to use their numerical sequence skills to determine the amount of work done.
4. This question is getting students thinking about forces doing or not doing work. They also need to start considering what the units of energy are as the question doesn't give it to them for the last 2 parts.
5. More practice with using the work done equation
6. A more challenging question, very similar question 8 in the class work. This time it is about a goat, rather than a suitcase.
7. Again a more challenging question. This question aims to get students to realise that the amount of work done is the amount of work that goes from one store to another. In this case from the gravitational potential energy store to the kinetic energy store and back again.