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| **Investigate reverse writing through mirror games** | | | |
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| See how words change when reflected in a mirror | | | |
| **Subject(s):** Science  **Approx time:** 40 - 60 minutes |  | | **Key words / Topics:**   * Mirror * Reflection * Light |
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| **Suggested Learning Outcomes** |  | |  |
| * To understand what happens when light is reflected off a mirror * To be able to reverse write and read it in a mirror | | | |
| **Introduction** |  | |  |
| This is one of a set of resources developed to support the teaching of the primary national curriculum. They are designed to support the delivery of key topics within maths and science. This resource explores what happens when light reflects off a mirror or other reflective surface. The focus is the use of reverse writing to see how it reflects in a mirror.  We use mirrors everyday to see what we look like. Car drivers use them to see cars behind them, to help them drive and park safely. However, is the image we see the same as if we were to look from the direction of the mirror? | | | |
| **Purpose of this activity**  In this activity learners will learn about the reflection of light in a mirror. They will use reverse writing to see how words change when reflected in a mirror. Learners will have an opportunity to practice reverse writing and to make notes.  This activity could be used as a starter or main activity to introduce light and build on experiences to explain how light travels. | | | |
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| **Activity** |  | | **Teacher notes** |
| **Introduction (5-10 minutes)**  Teacher to explain that learners are going to work with light reflection in a mirror and have a go at reverse writing.  Teacher to hand out equipment needed for the task to learners.  **Demonstration and pupil activity (30-50 minutes)**  Teacher to demonstrate the steps shown in the teacher presentation and listed below.   * Step 1 – learners to write their names on a piece of paper. Place a mirror next to the writing and see what it looks like. * Step 2 – Learners to write their names backward from right to left on a piece of paper. Some learners will find this challenging. * Step 3 – To get a clearer view of the reverse writing, learners should hold the mirror to the right-hand side the writing and the text will appear the correct way around.   Learners to complete each step to conduct the activity for themselves. The teacher presentation could be left on the whiteboard as a supporting guide as they do this.  **Discussing the results of the activity (5-10 minutes)**  Teacher to explain how light reflects in straight lines and why the writing reflects differently when the mirror is placed at different sides to the writing. |  | | This activity could be carried out individually or in small groups.  This activity demonstrates how light travels in straight lines. Step 1 and 2 involve the learner writing their name and seeing it reflected in different directions, which will create learner discussion. Step 3 places the mirror on the right-hand side of the paper and allows the writing to be read correctly.  The teacher may wish to demonstrate the first steps then allow the learners to reverse write with the mirror placed on the right-hand side. This will allow the learners to see their writing develop the correct way around.  Note that when writing in resource, learners must reverse the letters, not just put them in reverse order.  When the leaners are more confident reverse writing, they can be tasked with writing messages to their friends. |
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| **Differentiation** |  | |  |
| **Basic** |  | | **Extension** |
| Provide samples of reverse text that pupils can read in the mirror. |  | | Write longer notes to their friends and see if their friends can read them. |
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| **Resources** |  | | **Required files** icon-docicon-pdficon-ppt |
| * Small mirrors * Paper |  | | Teacher presentation – Reverse writing |
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| **Additional websites** |  | |  |
| * **Bitesize** **– Light:** <https://www.bbc.co.uk/bitesize/clips/z3mb9qt> * **Bitesize** **– Light sources:** <https://www.bbc.co.uk/bitesize/clips/z3vnvcw> * **Museum of Science - Mirror Writing** <https://www.mos.org/leonardo/activities/mirror-writing> | | | |
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| **Related activities (to build a full lesson)** |  | |  |
| **Starters** (Options)   * Ask learners to state three things they already know about light and where it comes from. * Discuss what is meant by ‘reflection’. | | **Extension** (Options)   * Investigate and make notes of what happens to the reflection of the reverse writing when the mirror is placed on different sides of the writing. * Visit the Museum of Science website and discover more about mirror writing and Leonardo da Vinci. * Write longer notes to friends and see if they can read them.   **Plenary**   * Discuss the outcome of the activity and how difficult the learners found reverse writing. * Show an example of Leonardo da Vinci’s mirror writing to show how old the technique is. | |
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| **The Engineering Context** film |
| Engineers need to have good understanding of how light travels and is reflected off surfaces. This is vital when engineers design rear-view mirrors for cars, periscopes for submarines and giant telescopes to look at the stars. |

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| **Curriculum links** | |
| **England: National Curriculum**  Science  KS2 Year 3 Light   * Notice that light is reflected from surfaces. | **Northern Ireland Curriculum**  Science  KS2 – Shape and space   * … reflect shapes in a line … |
| **Scotland: Curriculum for Excellence**  Sciences  Forces, electricity and waves – vibrations and waves   * SCN2-11b | **Wales: National Curriculum**  Sciences  KS2 How things work   * 5. how light travels and how this can be used. |
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| **Assessment opportunities** | | |
| * Formal teacher assessment of activity results. * Formal teacher assessment of practical Science skills through observation of learners. | | |
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