# *Plasticine investigators* **Teacher background notes**

**In these investigations, the physical changes made to plasticine when it is manipulated in different ways, including the softening of the material by warming, are investigated.**

## [Australian Curriculum: Science links](https://assist.asta.edu.au/resource/3980/plasticine-investigators-cle-year-1)

## Learning intentions

Students will be able to:

* understand how materials can be changed by interacting physically with the material (plasticine) [including temperature change];
* understand and use appropriate scientific vocabulary to describe and compare properties of materials;
* measure by comparing objects, or by using informal units;
* identify and explore information and ideas;
* respond to questions, make predictions, and participate in guided investigations;
* follow instructions to record (including the option of using digital technologies) and to sort their observations and share them with others.

## Suggested time frame for this CLE

The time needed to complete the *Plasticine investigators* CLE will depend on the depth of the prior knowledge of students, the time to perform the two investigations—‘What can we make with plasticine?’ and ‘Plasticine investigation’—and follow up with any further extension activities. Allow 2.5–4 hours.

## Prior conceptual knowledge

Science / Year Foundation / Science Understanding / Chemical sciences

Content description

*Objects are made of materials that have observable properties.* [*(ACSSU003)*](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU003)

## New concepts to be introduced

The concepts of physical and chemical changes are challenging for both primary and secondary students. Familiarity with these concepts is sequentially built upon over the course of a student’s engagement in the primary and secondary school science curriculum. In this initial introduction to physical changes, students are introduced to the term ‘physical change’ in relation to the changes made when interacting with a material. They explore how the shape and feel of plasticine can change when it is manipulated and when it is warmed. During these initial explorations, teachers will encounter various student misconceptions. Purposeful teaching will help prepare students to tackle more advanced concepts as they come across them in the upper primary years and beyond.

## Possible misconceptions

|  |  |
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| **STUDENTS MAY THINK…** | **INSTEAD OF THINKING…** |
| Changing the physical appearance of the plasticine (for example making a longer snake) also changes the mass of the plasticine. | The overall mass remains the same when the plasticine is manipulated into different shapes. Mass will only increase or decrease if material is added or removed. |
| Changing an object’s physical properties due to temperature indicates the material the object is made from has changed. | Heating and cooling does not change the material from which the object is made.  For example, cool and hot bread is still bread, however, if the temperature increase is very high, such as occurs when cooking toast, there may be a change in the chemical composition of the material. |

## Links to further information

‘Misconceptions: Physical and Chemical Changes, YouTube (3:02 min)<https://youtu.be/1tvjnUcWh8U>

This video is intended as teacher background information and may help teachers to use the scientific language of physical changes appropriately. **Note:** the information in this video is not appropriate for students in Year 1. It explains why using words such as ‘usually’ rather than ‘always’ or ‘never’ when defining physical (or chemical) change can mean students are less likely to be confused in later years when studying more advanced chemistry.

McLeod, Saul. 2010. *Concrete Operational Stage*, Simply Psychology website, <http://www.simplypsychology.org/concrete-operational.html>

An article on Piaget’s theory of cognitive development and conservation.