

Colour by pH: notes for teachers

A fun set of worksheets to print and colour using the pH scale as a guide to the correct colour.

Scientists use the pH scale to measure how acidic or alkaline liquids are. Lemons taste sharp because they are acidic - about pH 2. Water is neutral and is pH 7. Sea water is an example of an alkali and is about pH 8 and many household cleaning products range from pH 8 –14.

When a substance called Universal Indicator is added to liquids it will change colour, depending on their pH. Learners should be reminded that 'pH' always has a small 'p' and a capital 'H'.

Safety

It is important to emphasise to learners that both strong acids and strong alkalis are corrosive and can cause burns. You must never put anything in your mouth unless you are sure it is safe to eat or drink. Gloves must be worn when handling alkalis such as household cleaning products. They are never safe to drink.

Learning Objectives:

1. To introduce learners to the concept of acids and alkalis.
2. To familiarise learners with the range of colours produced by Universal Indicator.

How to use

Print out one or all of the accompanying sheets and allow learners to explore the colours of the pH scale by using the associated numbers to match the colours of the Universal Indicator.

The sheets are differentiated by numeracy skills. Some of them use simple number matching, whereas others need addition and subtraction skills. Therefore, these sheets could be used by 4–7 year olds to reinforce learning in numeracy, or by ages 7–11 or 11–14 to introduce the pH scale.

Talking points

While learners are exploring the colours of the pH scale, ask them questions to explore their understanding. Here are some examples of questions you could ask (*with suggested answers*):

- What are the smallest and largest number of the pH scale? *0 and 14.*
- Which colour represents the strongest acid? *Red (0).*
- Which colour represents the strongest alkali? *Purple (14).*
- Why might it be difficult to use Universal Indicator to identify the pH of a coloured liquid (eg cola)? *The colour of the liquid will hide the result or make the colour appear different to the observer.*
- Why do you think people need to wear gloves when using cleaning products like bleach? *Because strong alkalis are corrosive and could cause burns.*
- What does it feel like if you get an acid like vinegar or lemon juice in a small cut or graze? Why? *It stings because strong acids are corrosive and can cause burns.*
- Do you think Universal Indicator is the best way to test the pH of a liquid? *Encourage learners to evaluate using their own ideas. They may discuss limitations such as different people observing different colours. A different way to measure pH is to use a digital pH meter.*

Explore Further

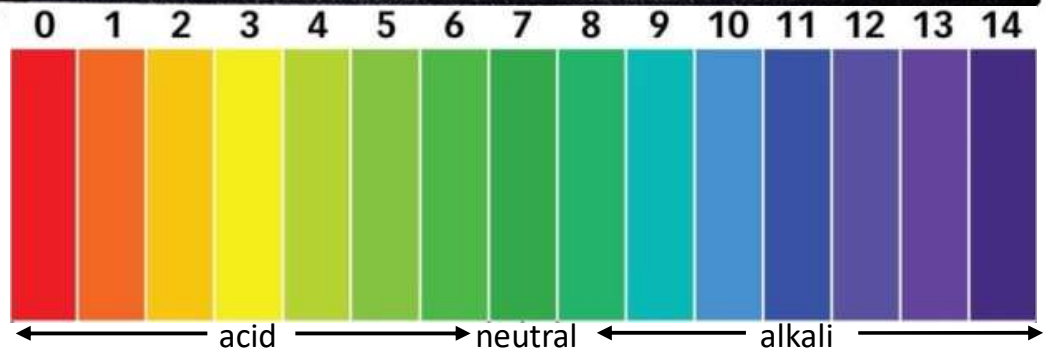
Find more resources to introduce pH on Steps into Science:

- Watch this video to find out how to make red cabbage indicator rainbows: <https://rsc.li/3qP4wBJ>
- Listen to a podcast about the common kitchen acid, vinegar: <https://rsc.li/3vOBUwf>
- Explore the basics of pH with this PhET interactive simulation: <https://rsc.li/3cdq3jP>

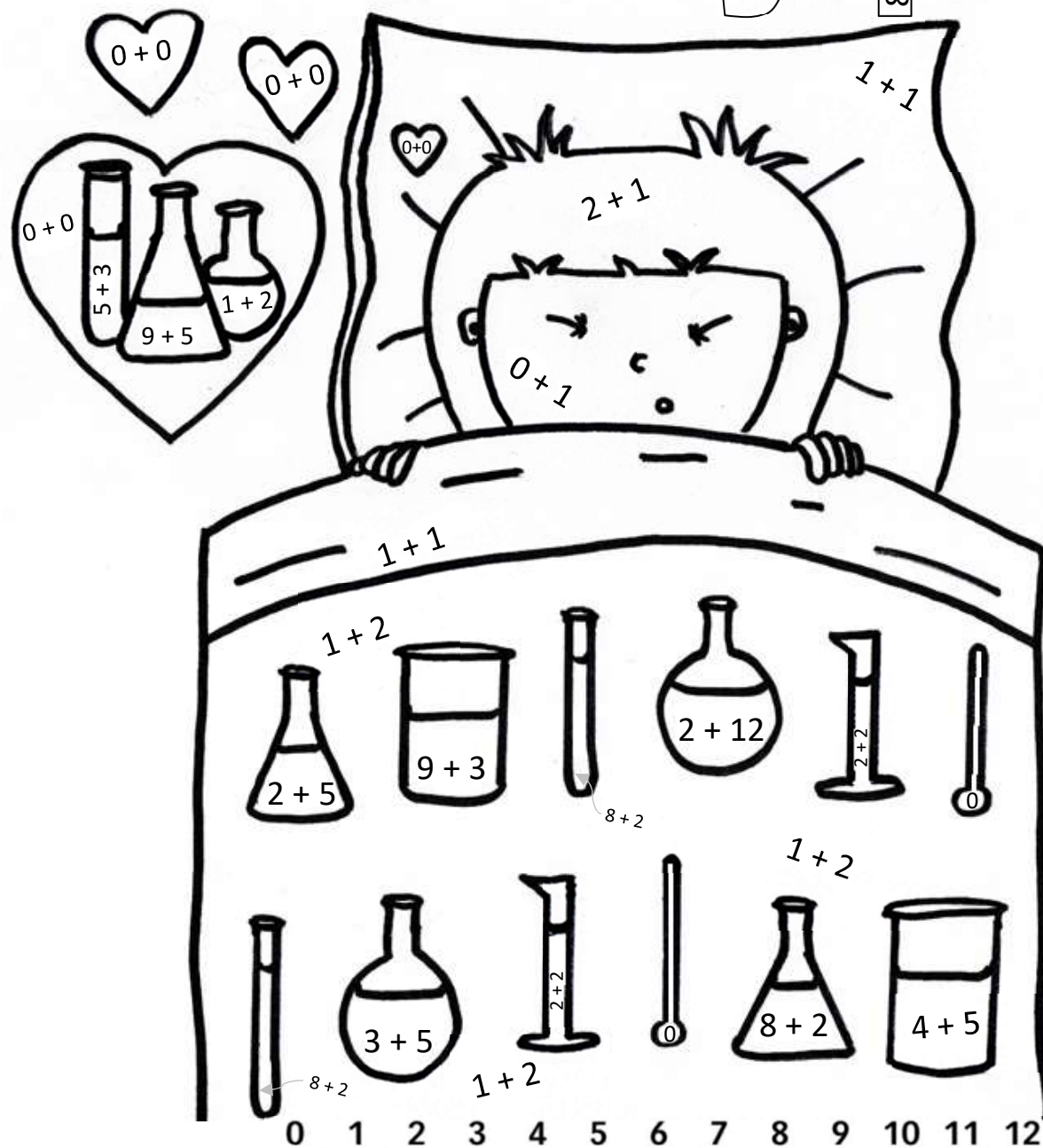
Colour by pH



Use the Universal Indicator chart to colour the picture



Colour by pH



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14



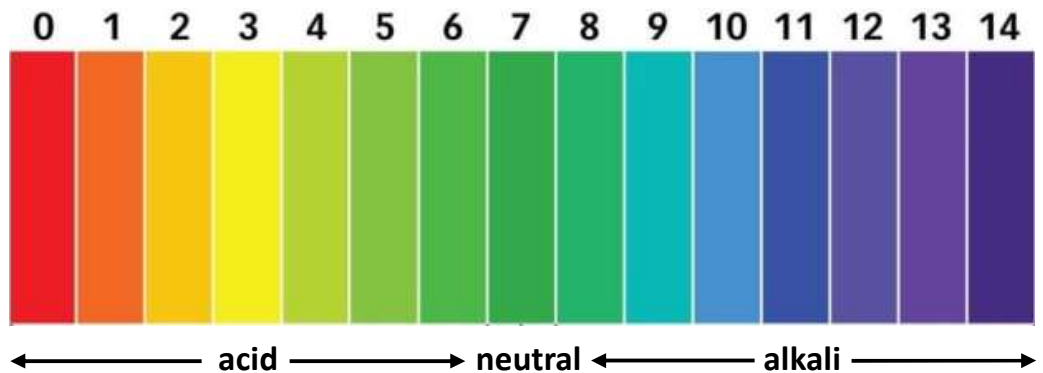
← acid ————— neutral ←———— alkali —————→

Use the Universal Indicator chart to colour the picture

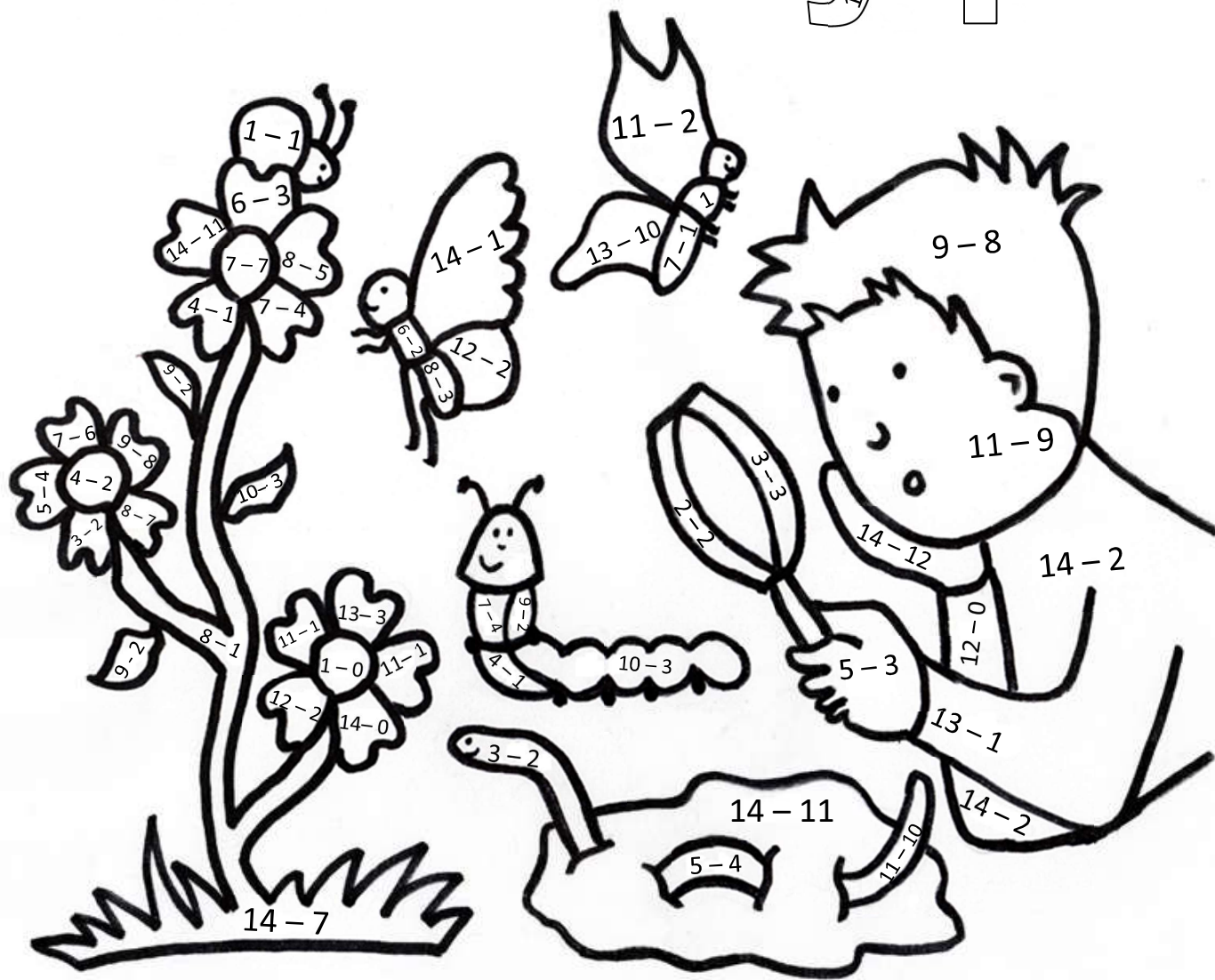
Colour by pH



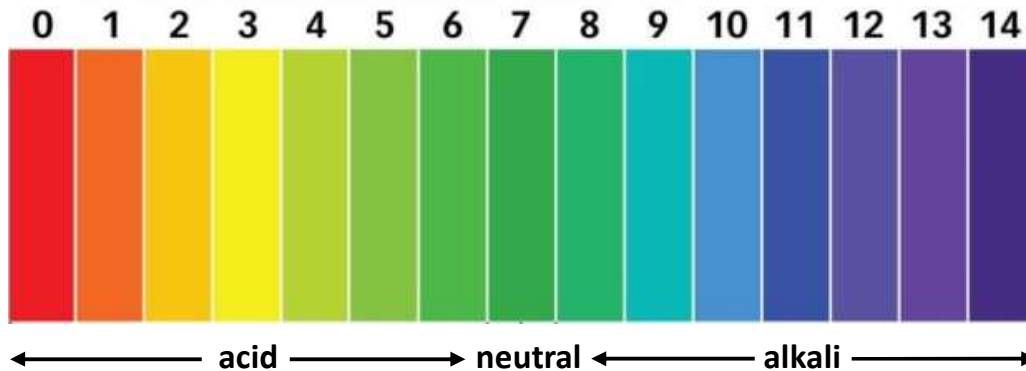
Use the Universal Indicator chart to colour the picture



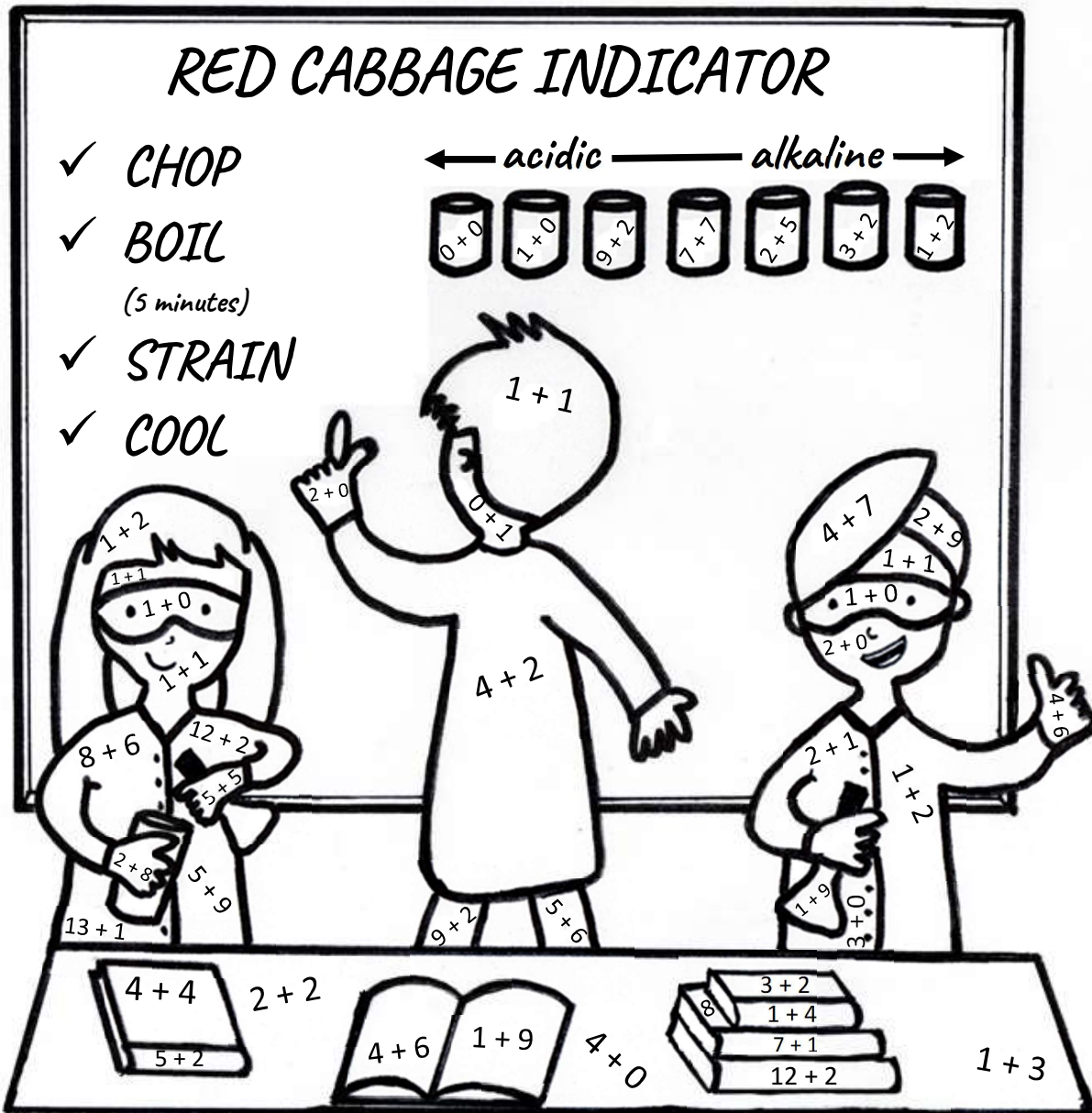
Colour by pH



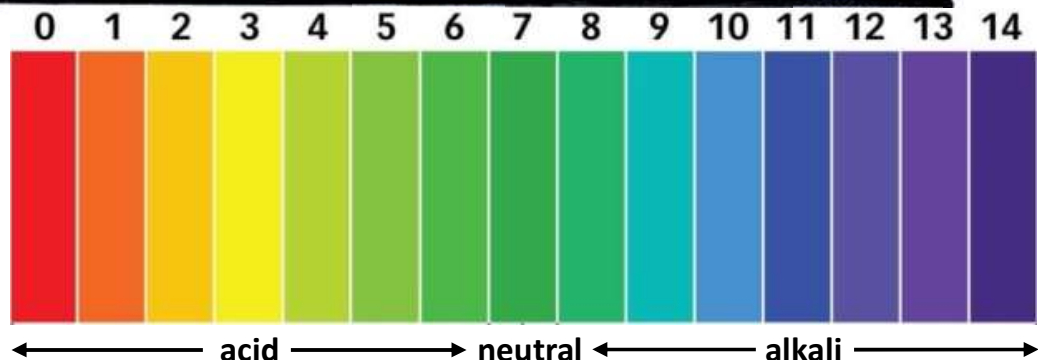
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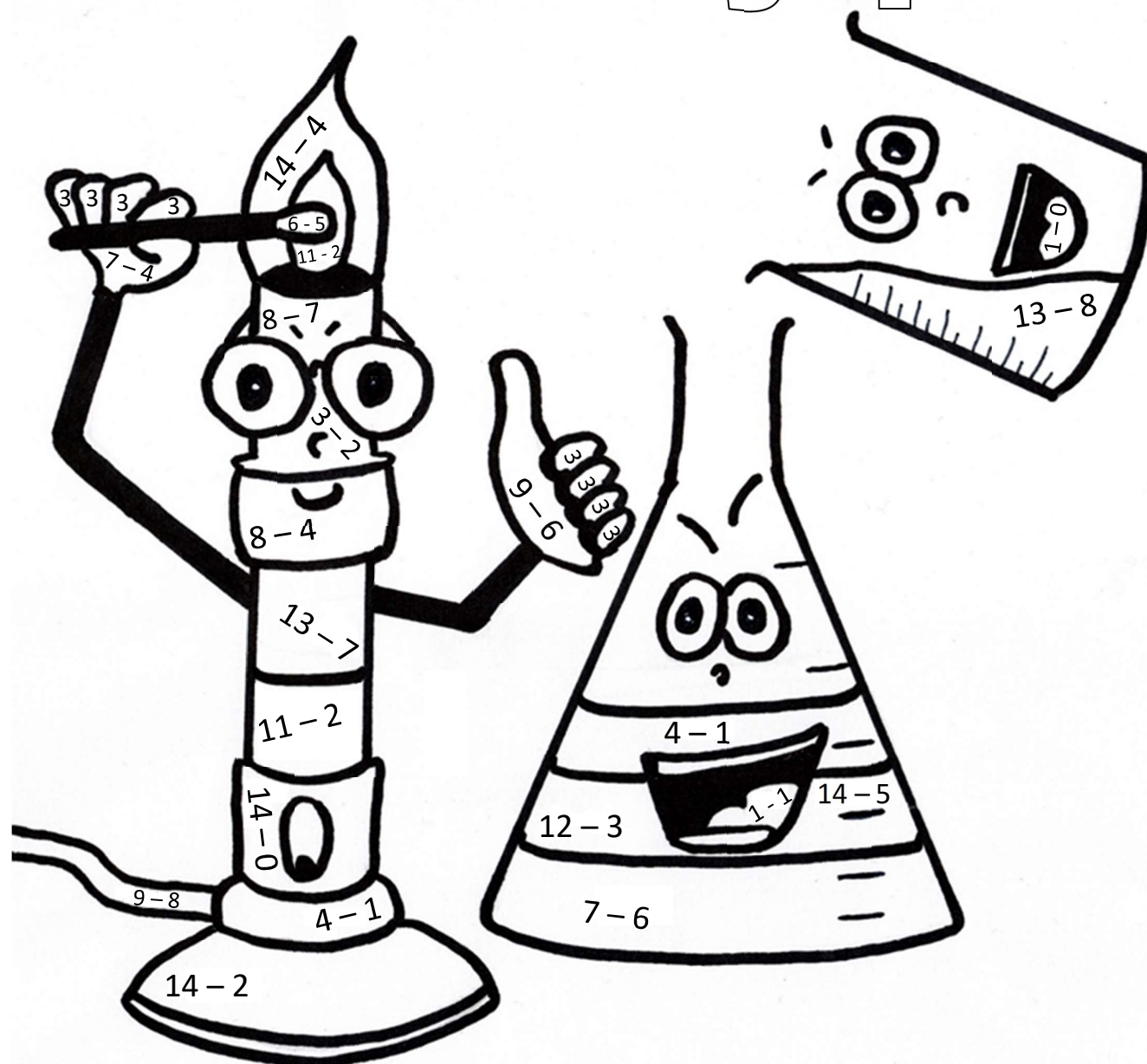
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