

# STEM By The Book

## Ella's Umbrella Courtney Strand

### Experiences and Outcomes

Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes. [SCN 0-15a](#)

Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges. [SCN 1-15](#)

I enjoy experimenting with a range of textiles.  
[TCH 0-04](#)

I am developing and using problem solving strategies to meet challenges with a food or textile focus. [TCH 1-04c](#)

I can match objects, and sort using my own and others' criteria, sharing my ideas with others over time. [MNU 0-20b](#)



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## Resources

### Keeping Dry

- 3 transparent plastic or compostable cups
- A variety of fabrics and materials (including items such as bin bags or aluminium foil) cut to the same size - to cover the top of the cups
- A tray
- Elastic bands
- Measuring jug and access to cold water

## Activity – Keeping Dry

In this award-winning book, Ella skips along in her wellington boots and with her bright red umbrella keeping her dry on a rainy day.

Start by asking learners to think about their own clothes and belongings, what would they wear on a rainy day? Do they have an umbrella or a waterproof jacket? Explore these items and begin thinking about what waterproof materials might look and feel like. Why are waterproof materials useful?

Before you begin this activity you might ask learners to bring in fabrics from home that are no longer needed so you can use these in your investigations.

Once you have a selection of materials cut them to the same size (Figure 1), ensuring they are large enough to comfortably cover the top of the cups.

Now you are ready to investigate which materials would make the best cover for an umbrella. Before you begin ask the learners to make their predictions about which materials will stop water getting through.

Place your cups in a tray to prevent any spillages and select three materials. Place the materials over the top of your cups and secure them using elastic bands (Figure 2).

Now gently press down in the centre of each material to make a small well.



Figure 1



Figure 2



## Activity – Keeping Dry

Using a measuring jug which allows the learners to clearly see the markings, measure out a small volume of water (we suggest 30ml of water)

Pour the water slowly into the well you made in each material, make sure not to allow it to overflow as this will make for an inaccurate result. Pour the same volume of water onto each material. For younger learners it might be easier to use a small container, such as an egg cup, to keep measurements the same.

Look at your cups and the materials, can you see water sitting on top of the material (Figure 3) or does it appear to have soaked through? (Figure 4)

The transparent cups allow learners to observe how much water has passed through each material. Were the predictions correct?

Learners might notice that some materials absorb the water and become saturated – would these materials make a good umbrella?

For a more detailed investigation you could pour the contents of each cup into an empty measuring jug and record your results on a graph.

Alternatively, you could lay each piece of material on a paper towel, pour the water onto the material and examine the paper towel underneath to see whether any water has seeped through.

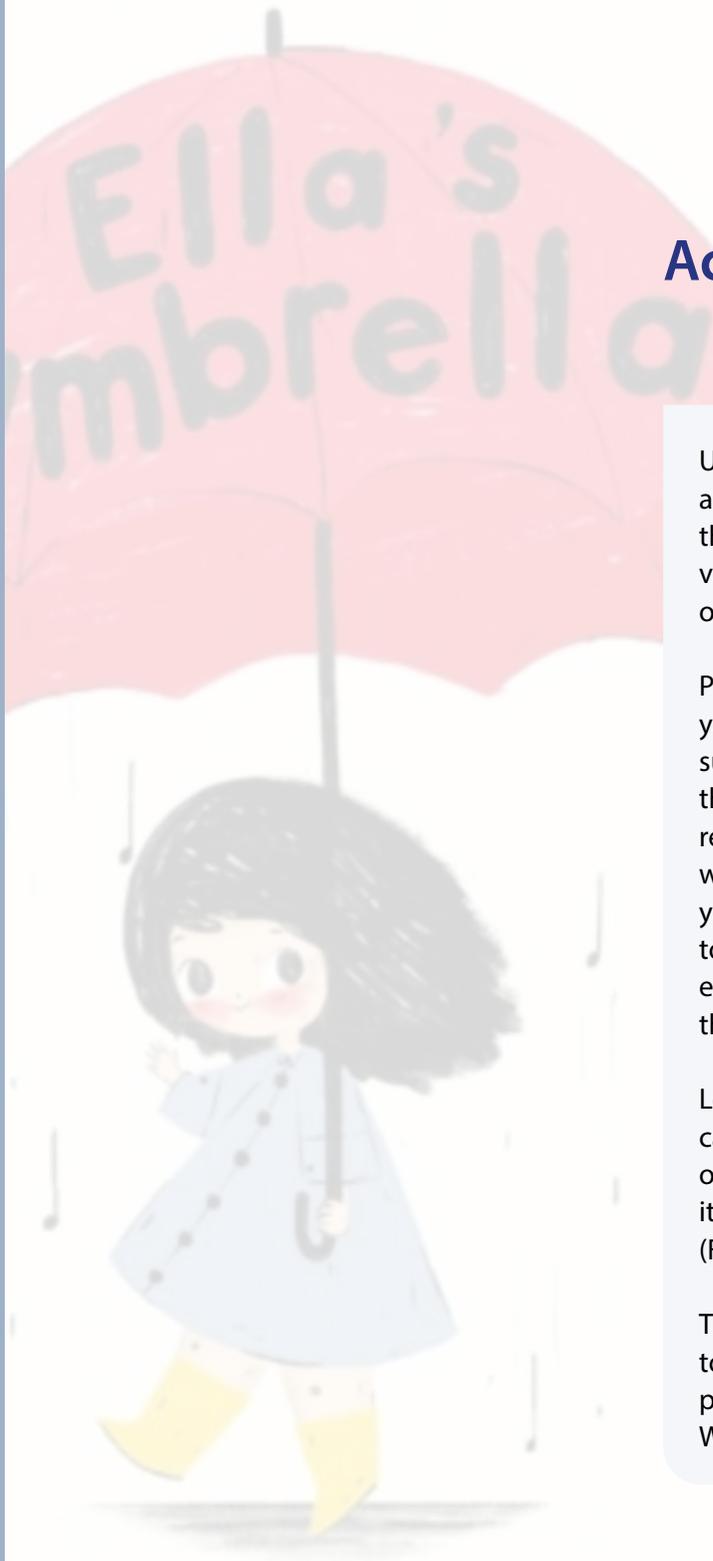
Talk about the materials you have selected - would these make a good umbrella? A piece of aluminium foil might keep the water out but what would happen when you tried to fold your umbrella away? You might like to make links to outdoor learning e.g. which materials would be best to make a waterproof cover for a den?



Figure 3



Figure 4



## What Next?

Sorting the materials into waterproof and non-waterproof is an example of classification. How else can the learners classify the materials? Perhaps by colour, pattern or whether they are transparent, translucent or opaque.

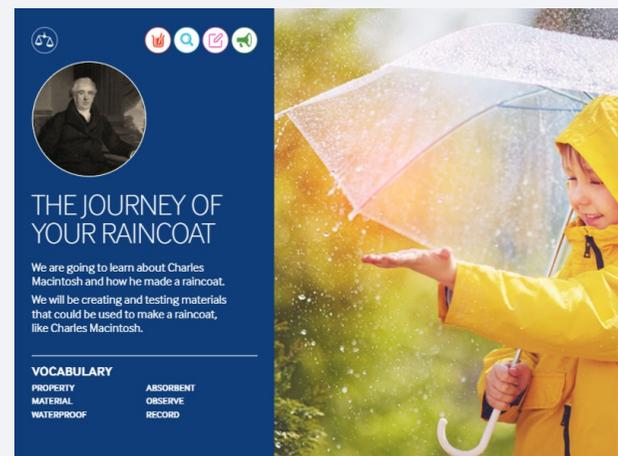
Look at other objects in your setting which you could sort and classify and think about how you would decide in which category each item belongs. For example, if you are looking at metal objects, how could the learners find out which ones are magnetic?

## Topic Links

Why not link your investigations to a topic such as Scottish Inventors?

Scottish chemist Charles Macintosh famously developed the waterproof fabric used in the Macintosh raincoat.

The Primary Science Teaching Trust have developed teaching resources full of information and ideas on this topic which can be found here - [Macintosh](#)







### THE JOURNEY OF YOUR RAINCOAT

We are going to learn about Charles Macintosh and how he made a raincoat. We will be creating and testing materials that could be used to make a raincoat, like Charles Macintosh.

**VOCABULARY**

PROPERTY	ABSORBENT
MATERIAL	OBSERVE
WATERPROOF	RECORD