[ACTIVITY DETAIL]

2. Water and ice

The first two investigations consider how to overcome some of the challenges created by water. The third activity is an exploration of ice.

OBJECTIVES

- To identify and names a variety of everyday materials
- To describe the simple physical properties of a variety of everyday materials.

WET WEATHER WEAR

Key ideas:

- Special clothing is worn to keep dry when it is raining
- The clothing is made from material which will not let the water pass through.

Resource ideas

selection of materials, such as cotton, nylon, polythene, wool, old umbrella fabric, old shower curtain, paper, card, etc. water tray cups and jugs small doll or teddy bear

The stimulus poem for this activity is 'Wet'. When you have finished reading the poem, discuss both the poem and the accompanying illustration with the children. Ask the children to spot as many things as possible which protect people from the rain. The picture shows rain coats, rain hats, pushchair covers, Wellington boots and umbrellas.

Show children the selection of materials. Ask them to test the materials out in the water tray, to find which ones will not let water go through and which will keep a doll or a teddy dry.

Depending on the independence of the children, they could be left to explore the different materials in the wet area. More able children can be asked to keep a record of what they find out. This can be done by sticking fabrics to a sheet and putting a tick or cross beside them to show whether they let the water through or not.

In the final discussion, ask questions such as:

- How many materials let the water through?
- What are these materials like? (describe them, e.g. any holes, etc.)
- How many materials kept the water out?
- Why do you think the water didn't go through?
- Which materials will make a good hat, coat or umbrella? (as well as waterproofing, children can think about the material being bendy, warm, easily stitched, looking nice, etc.).

As an additional activity, children could make a hat for the doll or teddy from the material they think is most suitable.

ARM BANDS (WATER WINGS)

Key ideas:

- Some materials float and some sink
- Arm bands must be made from a material that is waterproof and can be easily attached around arms
- Arm bands have air in them to make them float well.

Note: Depending on the children's previous experience, you may want to do some preliminary work on floating and sinking.

The stimulus poem for this activity is 'Water'. The poem is illustrated with a scene from a swimming pool, and this picture should be discussed once the poem has been read.

Ask children if they can spot the two things in the picture which are helping children float (arm bands and an inflatable, or 'rubber', ring) and what is the same about these two things. Children may talk about them being plastic and filled with air.

Resource ideas:

cotton fabric wool fabric sponge bubble wrap balloons polythene bags polystyrene sheet wrapping plastic cups Sellotape doll - to put in the water tray plasticine - to weigh down the doll

Challenge the children to make a pair of arm bands for a doll. Attach weights around the doll with string so it sinks without the arm bands, to represent someone sinking below the water.

Show children the range of materials they have to use and then leave the children in the wet area to explore the materials themselves, before they make the arm bands. The arm bands are most easily held in place on the doll's arms with elastic bands.

Note: Children will need help to blow up balloons. These should be only slightly inflated.

Once children have made their arm bands, these can be tested on the doll in groups or as a class activity. Focus the discussion on the properties of the arm bands that held up the doll, e.g. was the material waterproof, was there air inside, how did they stay on the doll's arms, etc. Ask children how they think they could improve their arm bands if they had time to make them again.

All the arm bands can be displayed for other children to try on the doll in the wet area.

Children draw their arm bands and some can write about what happened when the doll wore them, and why they think this was. Place emphasis on the 'finding out' element of the activity and the properties of different materials, rather than the importance of a successful pair of arm bands.

teacher of 5-6 year olds
Gawcott

Water wings were displayed on the doll, with real water wings beside her. This caused further discussion and observation when the balloons went down little by little, but the real ones didn't.

LIGHT AND WATER

Key ideas:

In bright light ...

- Sunlight and a spray of water are needed to see a rainbow
- Waves in water make patterns and shadows
- Reflections can be seen in water.

Resource ideas:

water play tray tidy trays (light and dark coloured) plant sprayer hose pipe (optional) bright torch ruler 3D shapes, e.g. cubes, cones, etc.

The stimulus poem for these activities is 'Squirting Rainbows', in which the children play in a paddling pool and with a hose pipe on a hot, sunny day. The first of the following three activities can only be carried out in bright sunshine, but the other two activities can be done with a bright torch instead, if necessary.

A rainbow, as illustrated in the book, can be observed on a sunny day through a fine spray of water. To observe a large rainbow for a reasonable length of time, create the finest spray possible with a hose pipe in the playground.

Children can try the same thing using a plant sprayer outdoors, though the rainbow is smaller, and can only be seen for the 1-2 seconds of squirting time.

Ask children to name the different colours they can see. Also ask them what the weather is like when a rainbow is seen in the sky. Discuss the spray of water (or 'rain') and strong sunshine needed to make a rainbow.

The second activity can be done outside on a sunny day, or can be done inside using a tidy tray and a bright torch. The torch should be fixed above the tray of water, so children do not handle it. Ask them what they see on the bottom of the tray, as they ripple the water with their fingers. The waves will create shadows on the bottom of the tray. Children then independently explore the different wave shadows they can make by tapping different shaped objects on the surface of the water. Tapping a ruler lengthways on the surface will result in straight line shadows, whereas dipping the end of a finger will produce circular shadows. Other 3D shapes from the maths equipment can be used, e.g. cubes, cones, etc. The vocabulary of shape is developed in this activity - by using words such as straight, curved, round, cube, cone.

Children can try dipping two objects at the same time (e.g. pencil points or their fingers) and observe what happens when the waves meet each other. They should see that the waves do not keep their smooth shape when they meet, but that the waves interfere with each other and make new patterns.

Children record their observations in drawings or paintings, to show the shapes of the wave shadows produced by different objects.

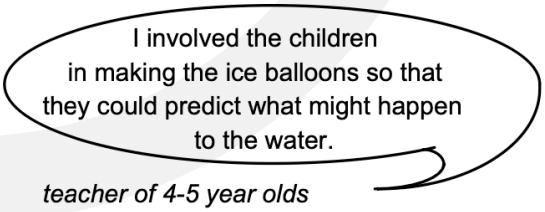
In an **additional activity** children can observe the effect of prisms on light as, again, rainbows are created.

ICE BALLOONS

The ice balloons must be made the day before doing the activity. To fill the balloons, push the balloon over the spout of a tap or watering can and hold in place whilst gently pouring in the water. Fill 4-5 balloons ***with differing amounts of water.*** *Fill 2-3 balloons with coloured water from a watering can. Knot the balloons and leave in a freezer compartment overnight. Cut the balloons away, revealing a smooth, round 'balloon' of ice which is an appealing shape for children to handle and explore. Bring the ice balloons into the classroom immediately prior to putting them in the water. If transferring balloons from a home freezer to a freezer compartment of a school refrigerator, ensure the balloons will fit into the smaller space!*

Resource ideas:

balloons water food colouring water tray or plastic tank freezer scales



teacher of 4-5 year olds
Newgate

Key ideas:

- Ice is frozen water and is very cold
- Ice floats on water
- Ice melts in a warm place.

The poem 'Cold' is set on a cold, frosty winter's day, and discussion can initially focus on children's experiences and feelings about cold winter days. The discussion can then move onto the effect of cold weather on water, e.g. icy roads, frozen puddles and ponds, hail stones, and snow.

Tell the children that you have some 'ice balloons' which you are going to put into the water tray. Ask them:

- What do you think ice balloons will be/look like? (then show the children)
- How do you think I made them?
- What do you think will happen when I put them in the water?
- Are they heavy or light? Can we measure their mass?

Safety Note

Children can feel the ice, but must not hold it.

Once the ice balloon preparation has been discussed, and predictions have been made, add the smallest ice balloon to the water. If the children are quiet, they will hear the cracks forming in the ice as it is surrounded by the warmer water. Children will also be able to see these cracks. Before adding each balloon, ask the children what will happen, and particularly whether it will float or sink. By the time the last balloon is added, children may realise that the size or mass of the ice balloon does not determine whether it will float, but that it floats because it is made of ice. Ask children to decide how much of the ice balloon is above the water, and how much is below. They should notice that the majority of the ice is below the water, but the ice is still floating.

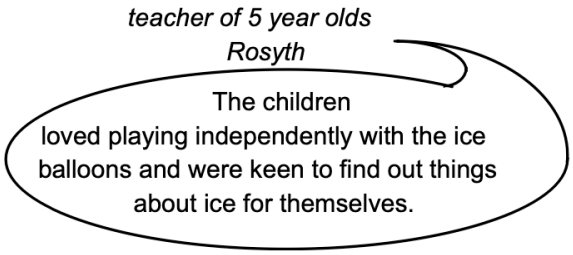
Allow the children to independently explore the ice balloons in the water. They can feel the ice by moving their hands over the surface. This will give them an idea of how much colder the ice is than themselves.

Tell children not to hold the ice, because it is so cold. Relate the temperature of the ice to that of snow - children who have made snowmen or snowballs will realise how cold this is. They can also push or spin the ice balloons, feel the water near to and far away from the ice, try and sink them, add warm water and observe the melting. The water will feel colder close to the ice, as this water has recently melted, and is slowly mixing with the surrounding warmer water. The coloured ice balloons will produce coloured water around the ice, which shows it is melting.

The ice balloons can take 5-45 minutes to melt (depending on their size, the amount of touching, the temperature of the surrounding water, and the amount of warm water added), so each group of children will require a new set of ice balloons, unless this is done as a class activity.

After the exploration, discuss the children's observations. Suitable questions to ask the children are suggested below:

- What did the ice balloon feel like?
- What happens when you touch the ice balloon?
- What was the ice balloon like when you started?
- What was it like when you had finished?
- Were all the ice balloons the same at the start?
- Were all the ice balloons the same when you had finished?
- What will the ice balloons be like after playtime/in the afternoon/tomorrow?



Leave the ice balloons in the water tray until they have fully melted. The discussion can thus draw children's attention to some of the following points:

- The ice feels light in the water (i.e. the ice is being held up by the water)
- The ice feels cold, and melts into water when touched
- The ice melts in the water
- The coloured balloons melt into coloured water, which mixes in with the rest of the water
- Small ice balloons melt more quickly than large ice balloons
- All the ice balloons will eventually melt if left in the water tray.