

# 1. Water - Three States

## 1.1 Objectives

- Recognise that ice and steam are water. Students describe observable properties of familiar materials including solids and liquids. (NP1.1)
- Understand that water is prevalent in the Earth's biosphere. Students observe and describe components of familiar environments. (L1.3)
- Observe solubility. Students describe observable changes that occur in materials. (NP1.2)
- Consider what humans need most to survive. Students discuss their thinking about needs of living things. (LL 1.1)
- Observe water in three states and the transitions between. Students recognise ways in which changes in properties of familiar materials occur (NP2.2)
- Students discuss their own thinking about natural phenomena. (SS1.1)

## 1.2 Required Materials

- Ice cubes and a safety kettle
- Water containers and salt
- Map showing predominance of water on the Earth's Surface
- Worksheet with keywords & diagrams to colour
- Journals, pencils, writing & drawing equipment

## 1.3 Program

Lesson Element	Time
➤ Show the ice cubes to the group and allow some handling. Briefly discuss properties of ice - cold, hard etc. Place ice on a plate in the sun to melt.	5-10
➤ Show map and have students identify that most of the Earth is covered in water. ➤ Indicate Antarctica, show image and discuss.	5-10
➤ Is Ocean water the same as tap water? Can we drink it? Why not?	5
➤ Pour salt into containers and pass out. Everyone in turn shakes the containers until all the salt is dissolved. ➤ Explain what happened to the salt and relate that to ocean water.	5
➤ Bring in the plate with the now melted ice. Discuss what has happened, emphasising that this shows that ice <u>is</u> water.	3-5
➤ Put the melted water into the jug. While it boils discuss the air and explain humidity. When the jug boils indicate the steam and emphasise that it is also just water. Indicate some clouds discuss that they, like steam, are made of water vapour.	5-10
➤ Brief revision - solid, liquid, gas	2-3
➤ Worksheets	10-15

## 1.4 Reflection

A long lesson, perhaps too long, as Mrs Q noted. The variety of material served well to maintain attention but there were still some wandering minds. Stopping for an activity kept their interest as did having them perform small tasks like putting out the ice and tasting the melted water. Some of the Grade 1s just did not follow any more than about two minutes of talk. I need to tactically ignore certain behaviours, such as Casee's permanent hand up and Matthew, Stevie and Woody's constant interjections. I don't know what to do about Jaidyn's, Ben's and some others' seemingly complete disengagement.

## 2. Properties of Water

### 2.1 Objectives

- Understand that water, like all liquids is self levelling. Students describe observable properties of familiar materials including solids and liquids. (NP1.1)
- Apply that understanding to a levelling exercise. Students illustrate different ways that applications of science affect their daily lives (SS1.3)
- Consider & discuss the oceanic tides. Students observe and describe components of familiar environments (L1.3). Students describe obvious events (including day and night) that occur on the Earth and in the sky. (EB1.2)
- Consider what humans need most to survive. Students discuss their thinking about needs of living things.(LL 1.1)

### 2.2 Required Materials

- Clear plastic tubing & fittings, plastic bottles, spirit level
- Diagrams of water traps and siphons.
- Worksheet with keywords & diagrams to colour
- Journals, pencils, writing & drawing equipment

### 2.3 Program

Lesson Element	Time
➤ General recap of Solid, Liquid, Gas from last week	10
➤ Pass around the small water bottles and the frozen bottles. Students to discuss the differences, meanings and possible uses. Using water bottle as stimuli, show that water is always level in the bottle and discuss. Pass around a spirit level and compare it with the bottle. Discuss the tides and compare with the fluid movement in the bottle.	10
➤ Show the water-level and fill one side with water. Discuss their predictions about what will happen when the valve is opened. Lift one side then the other to demonstrate the levelling principle. Discuss where this principle is commonly used - sink and toilet traps	10
➤ Show the longer level and explain the task - to mark a level around the building. Practise with one group. Talk about appropriate group behaviour and split into groups. Move outside and work with the water levellers.	15-20
➤ Brief revision - tides, the nature of fluidity.	5
➤ Taskwork - a picture and some words describing something we have learned about water today	Til lunch

### 2.4 Reflection

General attention was good and the groups responded well to the ice/water provocation. Some groups functioned well, others dismally. I could probably select the groups better. The discussions were a bit more focussed this week though some kids are hard to keep engaged. Must find a way to keep them from annoying one another with bumping, moving about etc. Distracts everyone. Physical demonstrations captivate them - especially when they don't anticipate what will happen. Everyone was riveted when, against their prediction, the water did level between the bottles. This did not translate into success with using the water levels themselves. This task was a little beyond their physical dexterity and most did not really grasp the usefulness of the water level.

### 3. Where Does Tap Water Come From? And Where Does it Go?

#### 3.1 Objectives

- Observe insolubility. Observe coarse filtration and connect with solubility. Students describe observable changes that occur in materials. (NP1.2)
- Consider what humans need most to survive. Students discuss their thinking about needs of living things. (LL 1.1)
- Understand that water is treated before and after our contact with it. Students consider different ways that applications of science affect their daily lives (SS 1.3)
- Apply previous learning to understand water gravity reticulation. Students identify the effects of energy in their daily lives. (EC1.2)

#### 3.2 Required Materials

- Water containers and oil
- Small filtration set - bottles, sieves, funnels etc
- Water treatment & tower images
- Journals, pencils, writing & drawing equipment

#### 3.3 Program

Lesson Element	Time
➤ General recap of fluidity, water level and solubility from previous weeks.	10
➤ Display one water and oil bottle and indicate the oil floating on the water. Break into groups using the oil/water as provocation, have students jointly explore & explain the phenomenon.	15
➤ Regather and share the learning. Connect with the oil's insolubility with salt's solubility. Introduce and discuss the idea of purifying dirty water.	10
➤ Display water bottle with sand. Have a volunteer attempt to dissolve the sand. Add other contaminants - dirt, leaves etc. Display the filtration device and pour the dirty water into the filter	10
➤ While the water filters speculate about what will happen. Extend the filtration concept to desalination and recycling.	5
➤ Show images of water towers & treatment as stimuli for discussion. Briefly explain & discuss other elements of water treatment - settling, chlorination, oxygenation, fluoridation.	10-15
➤ Recap the morning	5
➤ Taskwork - a picture and some words describing something we have learned about water today	Til Lunch

#### 3.4 Reflection

While the students enjoyed shaking the oil and water, they did not work well in groups and the groups did not stimulate any worthwhile thinking. No group produced any idea about why the oil and water did not mix or why they always settled in the same order. Thankfully some individuals figured it out later during the sharing discussion so that it was elicited from rather than given to them. I probably need to reiterate appropriate group behaviour every time before breaking into groups. A variety of short activities and discussions seems to work OK to sustain their engagement. Have to always keep an eye on the little grade ones, like Achol, who likes to daydream and Peter who likes to distract others when he disengages. Stevie and some others are compulsive call-outs. Must clamp down because it is unfair to those who keep the code.

## 4. The Water Cycle

### 4.1 Objectives

- Observe the results of coarse filtration and connect with solubility.. Students describe observable changes that occur in materials. (NP1.2)
- Observe evaporation and condensation (NP1.2)
- Consider what humans need most to survive. Students discuss their thinking about needs of living things.(LL 1.1)
- Understand that water moves around the world in all three states driven by the sun. Students identify the effects of energy in their daily lives. (EC1.2)
- Apply previous learning to understand siphon action. Students consider different ways that applications of science affect their daily lives (SS 1.3)

### 4.2 Required Materials

- Safety Kettle, ice, water containers
- Siphon hoses and water trough
- Water cycle images
- Journals, pencils, writing & drawing equipment

### 4.3 Program

Lesson Element	Time
➤ General recap of three states, solubility and insolubility from previous weeks.	10
➤ Recall excursion to Rail Museum to seed a discussion about steam and its relationship to energy. Where does the energy come from? ➤ Boil kettle and talk about the heat & pressure of steam as a power source. Where does the energy come from?	10-15
➤ Show image of water cycle and discuss with emphasis on the sun as an energy source driving a system. ➤ How does the water move from the ocean to the mountains? Can I move water out of the kettle and into the glass in the same way? ➤ Boil the kettle again and emulate the water cycle with evaporation, condensation and precipitation. Debrief with questions.	10-15
➤ How else can we move water from one container to another? ➤ Show the water level with the lid on. Why does it not work? ➤ Move to the water trough and demonstrate siphoning emphasising that the water draws itself through.	10
➤ Students to try siphoning in groups.	15
➤ Water cycle word worksheets	Til Lunch

### 4.4 Reflection

Relating back to the steam trains seemed to work well as an "in" to steam generally and most seemed to follow into thinking about energy and it's sources. There always seems to be one or two disengaged, not always the same ones, and maybe that's the way it is. I monitored the known inattentives, Liam, Charley, Jaidyn, but that just took my eye off Stevie, who was quite knowingly naughty and some others, like Matthew, who just stepped up to do "distracted duty". Crowd control outside was a real issue, as without constant instructive reminders many of the class lose focus, worrying instead about whether it's their turn or if they're getting to do what they wish. However all of the groups successfully siphoned, many both into and out of the bottles and most seemed to grasp why it worked. Considerable interest in the large colour "Water Cycle" poster was heartening and their discussion among themselves reflected a fairly accurate understanding.

## 5. Water Basics Revision & Floating & Sinking

### 5.1 Objectives

- General Revision - the three states of water, solubility, the water cycle and insolubility. How much water in a person? Students discuss their thinking about needs of living things.(LL 1.1)
- Observe floating & sinking. Students observe and describe components of familiar environments (L1.3). Students describe obvious events (including day and night) that occur on the Earth and in the sky. (EB1.2)
- Predict the behaviour of differing materials in water. Students describe observable properties of familiar materials including solids and liquids. (NP1.1). Check those predictions. Students illustrate different ways that applications of science affect their daily lives (SS1.3)
- Apply previous learning to understand why some things float and others not. Students consider different ways that applications of science affect their daily lives (SS 1.3) Students describe observable changes that occur in materials. (NP1.2)

### 5.2 Required Materials

- Water container(s), floating and sinking objects
- Group worksheet
- Human Water content image.
- Journals, pencils, writing & drawing equipment

### 5.3 Program

Lesson Element	Time
➤ General discussion of all from previous weeks.	10
➤ Is my arm solid, liquid or gas? Show the water man image and discuss. Do I float or sink? Would my exact shape in water float or sink? What about oil? Why	10
➤ Display the task sheet and outline the task.	5
➤ Discuss in groups and predict what will sink and what will float.	5
➤ Take the objects to the water and test the predictions.	10
➤ Return to desks and complete the sheet	10
➤ Debrief	5

### 5.4 Reflection

Revision went well with most students displaying a cumulative understanding of water. Group work was much better, possibly because I selected the groups according to the existing seating arrangements rather than at random. Also a more elaborate and repeated explanation of the task and a graphical and more self explanatory task sheet helped some, especially the littler ones, to better participate. Others already understood the concept of density from using the water CD, which tied nicely into the discussion and gave them a head start with the floating & sinking. People like Stevie, Woodie and to some extent Charlie are bursting to help. If they can't position themselves to be a guide rail for others they can instead be disruptive. Solution: let them help - make them help, but without them appearing to be preferred. The group task sheet was well completed and the individual tasks were also well handled.

In general, a simpler task, with very simple, often repeated explanation before breaking into groups improved behaviour, participation and performance.

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