How to use
Unfolding Knowledge

For the minibook:
(1) pass it through your printer using DUPLEX setting with print to fit and page scaling switched OFF (so that you don't get white margins).
(2) fold once across the middle and cut along fold.
(3) staple or hot glue the spine to make a conventional book.
As you make more minibooks, keep the set in a box, and make class sets. Give them out as non-fiction reading units.
Make English comprehensions and summaries about them.
Help children to learn about how to help the planet by using examples like this.

Let's get outside to learn!

This is all about getting outside enjoying learning while you are out there. Every subject you study can be done outside, even if you might have to come inside to write things down. Geographers call it field trips, historians might call it local studies, scientists might call it experimental work.

But whatever it is being outside is all about observation. You look, you think about what you have seen, and then you develop what you have seen, fitting it into your curriculum, so it will enrich your studies. This project booklet is all about showing you how to do that. Science, English, Maths, History and Geography are all around you. Enjoy them, keep fit and active, stay healthy and learn for your curriculum while you are doing it.

Science/Geography curriculum coverage:
Weather
Changing from solids to liquids to gases
Water Cycle

8. Surface flow/ river

Do you think it is possible to make a model river in five minutes? It is, and this is how.

You need a clean washing up sponge cloth. Start with a new one, bone dry. The idea is that the sponge, with its connecting little holes, is like a soil, where water will percolate through. But if it rains too much then the water will go over the surface.

You need a small jug of water. Do this outside or over a sink or tray!

Fold the sponge into a valley shape. Pour water from the jug along the top line of the sponge. Don't get fed up, something is happening, but you can't see it. What?

After a bit a river will form. Where has the water come from? Stop pouring. What happens.

Can you use this model to explain why rivers don't increase immediately after it rains and why they continue for days after rain has stopped? (play the video on page 9 of 'The River Book')

Now you have done all parts of the water cycle - at home!

Finished with me? Pass me to a friend or recycle me.

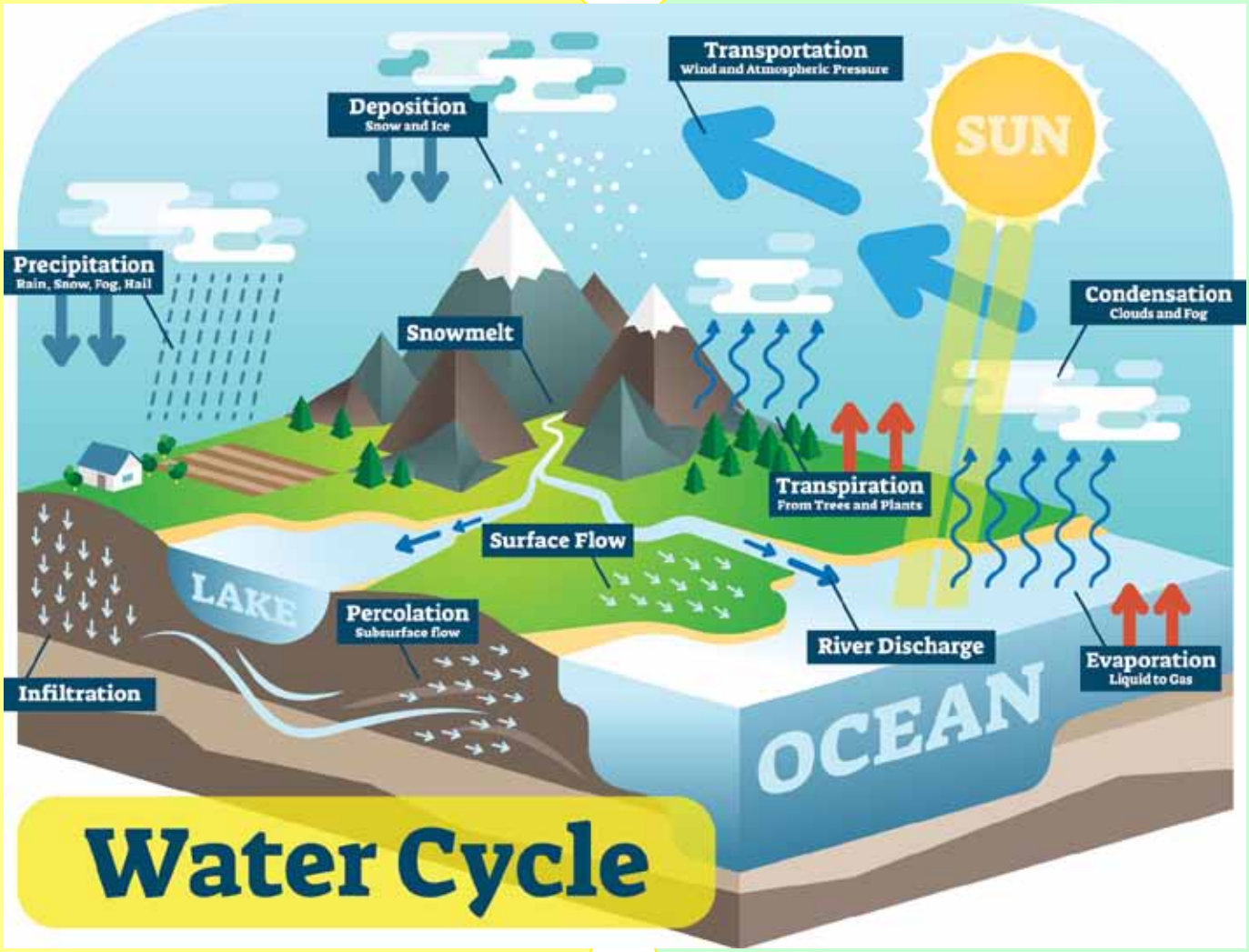
3

CurriculumVisions

Water cycle

The water cycle is a term used to remind us that water is never used up or lost, it just changes form, recycling forever.

All of these things to do are based on 'The River Book'. Why not read it.



You may have seen diagrams of the water cycle, but they always show mountains and oceans. But as those are probably not outside your door, how do you investigate the water cycle locally?

1. Let's start with the diagram on pages 4-5 which show all the main parts. We will then think up a way of investigating each part locally.

2. Extract the terms on the diagram and put those names at the top of separate pages in your notebook. I think they are: ocean storage; evaporation; transpiration; condensation; transportation; precipitation; infiltration; percolation; surface flow; lake storage; river flow.

3. Go outside and see if you can spot any of those. Probably just condensation = cloud, and possibly precipitation = rain. No sign of the others!

4. Ocean evaporation
Evaporation is why water liquid turns to water gas (vapour).

5. Making raindrops/dew
Clouds, raindrops and dew are the opposite of evaporation. They are condensation. Put a soft drink bottle three quarters full of water in a freezer for an hour or two. Bring it out and put it on a plate. Take close-up pictures of the side every minute for 15 minutes. Now describe what happened. You should see moisture (water vapour) from the air condensing into liquid droplets, then the droplets getting bigger and running down. That is what happens on leaves (dew) and in the air (in clouds to make rain).

6. Transpiration.
Transpiration is how much water leaves send into the air through tiny pores (stomata) usually on their undersides. Get a plant saucer and use sticky tape to make a marker line near the top. Put a plant with soft leaves into the saucer and stand it on a sunny window ledge in full sunshine. Using a measuring jug, fill with water to the marker line. Make a note of how much you added. Come back next day and see how much you have to add to bring the level back up. Repeat for several days. Note the weather

each day. Make a chart of transpiration and weather. Why might more water be used up the first day? What does that tell us about how to run an experiment?

7. Infiltration/percolation
Infiltration is how fast water seeps into the soil, percolation is how fast it goes through the soil vertically or horizontally.

You know those metal cookie cutters? Get a large one and push it half way into a patch of grass (lawn). Fill to the top with water, then measure how much water you needed to add to bring it back to the surface each (say) 15 minutes.

Find a different kind of ground, say a flower bed. Repeat the experiment.

Which has the greatest infiltration rate, grass or flower bed? Can you think why?

By the way your cookie cutter became a scientific instrument just then - an infiltrometer.

We can make a model ocean. Get a glass baking dish (that you might roast a joint in). This is the ocean basin. Now use sticky tape to make a line close to the surface. Optional: fill a jam jar with water and stand it inside to make an 'island'. Now fill the 'ocean' with water up to the line. Use a measuring jug from the kitchen, and make a note of how much water you added. Do it carefully.

Put in a warm room and come back next day. Using the measuring jug, see how much water needs to be added to bring it back to the top of the tape marker line. Make a note.

MATHS: By dividing this number into the total volume of water you added to make your ocean, predict how many days it will take to evaporate your ocean dry.

That jam jar island... if you have a digital temperature recorder, it probably has a hygrometer combined with it. Place it in the room away from the 'ocean'. Find the % moisture in the air. Now put it on the jar and compare readings. Is the air above the ocean more moist? That is evaporation in action.