



# All Systems Go!

In our school beside the wood, A grade \_ student by the win-dow stood. Saw a rabbit running by, Knocking at my door.

Help me! Help me! Help me! he said, There's a thundercloud overhead. Come little rab-bit, in with me! Safe and dry we'll be.

Age range: 5 to 9 (primary)

Time: 75 minutes

Subjects: Science, Drama

Resources: teacher song sheet, handout puzzle: *Forests: Mother Nature's Water Filter* (see page 16), scissors, glue, blue crayons.

## Learning Outcomes

Students will identify and understand the basic definition of a system and apply this to trees and forests as fresh water filters.

## Hook: Action Song



Students stand in a circle and sing the action song "In Our School Beside the Wood" (see above) with hand gestures. Each gesture lasts four beats or one line of lyrics. Demonstrate how to keep the beat by tapping your foot.

- In our school beside the wood,** ~ draw a box in the air with index fingers.
- A grade \_ student by the win-dow stood.** ~ make binoculars with hands.
- Saw a rab-bit run-ning by,** ~ make rabbit ears with two fingers; wiggle (4 times).
- Knoc-king at the door.** ~ knock in the air (4 times).
- Help me! help me! help me! he said,** ~ big wave to get attention (4 times).
- There's a thundercloud overhead.** ~ wiggle fingers overhead and bring down.
- Come lit-tle rab-bit in with me,** ~ make a beckoning motion (4 times).
- Safe and dry we'll be!** ~ pet the back of your hand with the other (4 times).

Sing the song once through with hand gestures, then repeat the song. Continue repeating the song, dropping the singing line by line until you are doing hand gestures only; keep the beat with your feet. Then explain to the class that they have just demonstrated a system because:

- 1) there were individual parts,
- 2) the parts made up a whole,
- 3) the parts worked together,
- 4) they followed a pattern, and
- 5) they repeated a pattern.

The students repeat these five criteria for a system, perhaps copying them down. Discuss other systems such as machines, cars or DVD players.

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## Procedure

The students will dramatize various systems: a cuckoo clock, a tree, a forest filter and then reinforce their learning with a cut and paste sheet.

**1 Demonstrate a cuckoo clock.** Begin by having students push the desks to the side and divide into groups of three, standing side by side. Call “Number One!” and the students on the left raise their hands, “Number Two!” and the middle students raise their hands, and “Number Three!” and the students on the right raise their hands.

- Number Ones: clasp their fists, hold their arms straight down and swing them left and right like a pendulum.
- Number Twos: hold both their arms in the air, straight over their heads, like the hands of a clock, then move one arm slowly around. When it comes back to the twelve o’clock position the other hand will move to the one o’clock position, and so on.
- Number Threes: repeatedly say, “Tick tock, tick tock”. When the hand gets to one o’clock, they will stick out their tongues and call “Cuckoo!” once, and then keep ticking. Repeat the actions for two o’clock, calling “Cuckoo!” twice, and for three o’clock calling “Cuckoo!” three times. Repeat entire sequence.

Discuss how the clock fits the five criteria of a system on chalkboard/display paper.

**2 Demonstrate a tree.** Illustrate the motions for each stage as you explain the action:

- Your branches sway in the breeze and your leaves flutter as they sway: hands flutter, sway.
- Your trunk stands tall and straight and strong on the ground: stand with arms up like branches.
- Your roots spread out firmly, wiggling around the particles of soil: spread feet, wiggle toes.
- Your leaves fall off and you are bare: shake “leaves” off hands.
- You are cold standing in the snow: shiver.
- But then you feel the warmth of the sun in the spring: stretch a little.
- Your roots drink up water and nutrients from the soil and send them to your crown: wiggles toes.
- Your buds open and begin to grow: wiggle fingers.
- Your buds are now leaves: spread out fingers and arms.
- They spread out all over as you get taller and wider: spread arms further.

Discuss how trees fit the five criteria of a system on chalkboard/display paper.

**3 Demonstrate the forest water filter.** Explain that the parts of a forest, much like a water filter on a fridge or on a tap, filter our water of pollutants and make it much cleaner. Illustrate the motions for each as you explain:

- Clouds form in the sky: arms and fingers outstretched to represent a wispy cloud.
- Rain forms in the cloud: arms and fingers brought close to body to become a rain drop.
- And mixes with pollution in the air: spin on the spot.
- Rains falls on the forest: lie flat or bend over to the side to become a rain drop spattering.
- Rain slides over the leaves and branches through the canopy and understorey to the ground: wiggle around.
- Some rainwater flows along the forest floor to the stream: run on the spot.
- The water is filtered by wetland plants and bacteria: make brushing off motions.
- The tree roots keep the banks of the stream strong so that the water stays clear: grab soil with your arms and legs (roots).
- Tree roots help some rainwater to go down into the soil (forward diving motion) to be filtered by bacteria in the earth before reaching the water table below (brushing off motions).
- Trees suck up the water with their roots and transpire it back through their leaves into the air as clean vapour: suck and swoosh noises.

Discuss how the forest filter fits the five criteria of a system.

**4 Ask the students to cut out the pieces of *Mother Nature’s Water Filter* puzzle** handout (see page 16). Assemble and glue onto a separate sheet. Using blue crayon, they should add arrows to show direction of water flow.



# Forests: Mother Nature's Water Filter

