

Water State Loop

Track water as it changes state.

S4E3.a "Plan and carry out investigations to observe the flow of energy in water as it changes states from solid (ice) to liquid (water) to gas (water vapor) and changes from gas to liquid to solid."

NAME _____

DATE _____

1 LABEL THE MODEL _____ Word bank below

Write one process from the word bank in each numbered box. Match each process to the arrow that changes one stage into the next stage.

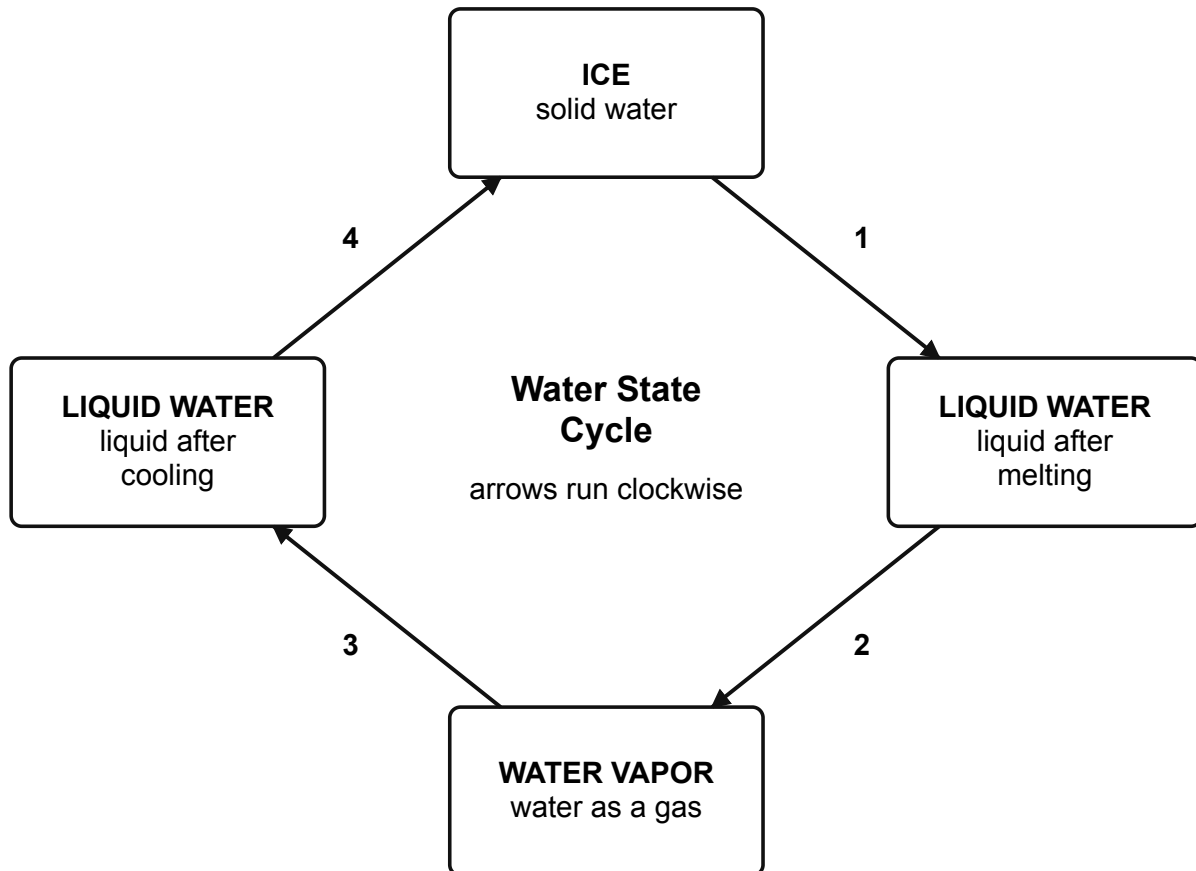
WORD BANK

condensation

evaporation

freezing

melting



Arrow numbers match the response boxes on the next student section.

Label the arrows

Use the word bank to write the process for each numbered arrow.

Arrow 1

Arrow 2

Arrow 3

Arrow 4

2 RUN THE MODEL _____ Use your finished diagram

1 Which process changes liquid water into water vapor?

2 Which stage comes right after water vapor in the model?

3 Which two processes happen when water gains energy?



CHECK IT

Before you turn it in

- ☐ I matched each process to an arrow.
- ☐ I used each word-bank process once.
- ☐ I checked the model against my actual water observations.

TEST THE MODEL

What is one part of real water movement that this model leaves out?

Investigate Water Changes

NAME _____ DATE _____

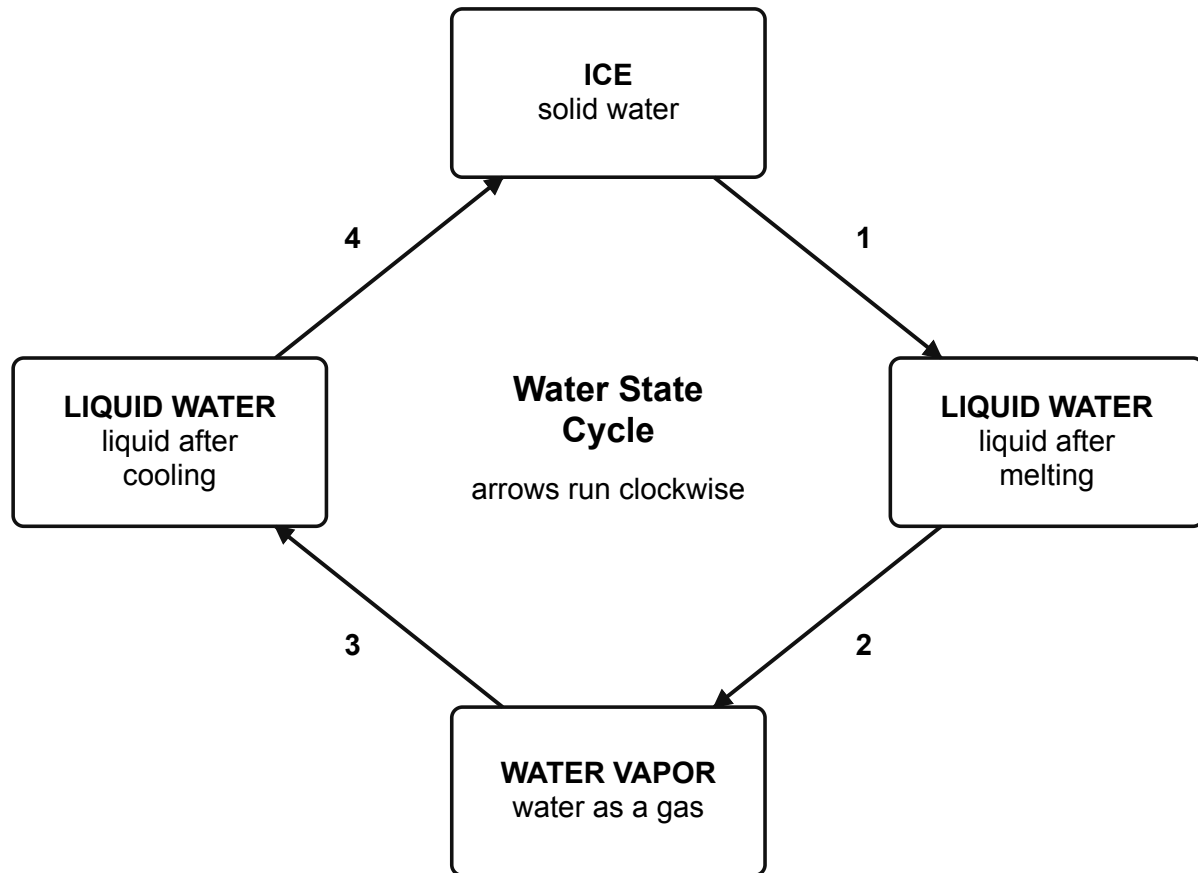
Plan with your teacher: choose a question about water gaining or losing energy. Predict each state change. Specify equal starting amounts and matching plastic containers where comparing. Teacher supplies ice, water, trays, safe thermometers, clock and a freezer. Write your plan below.

Carry out four checks with adult help: A, watch ice melt in a room for 15 minutes; B, teacher freezes liquid water overnight; C, mark a shallow water dish level and check it after 24 hours; D, wipe an ice-water cup outside dry and watch for new outside drops for 10 minutes. Record test/time, actual before/after states or level and evidence of energy gain/loss. For D the outside drops come from air water vapor. Explain which model arrow each observation supports; record no change honestly and extend time if needed.

Test / times	Observed before and after	Energy / model arrow

Do not drink test water. Adult manages the freezer; no stove, boiling water or sealed heating. Use extra paper for continued observations and your explanation.

PART 1 • COMPLETED MODEL

**Arrow 1**

melting

Arrow 2

evaporation

Arrow 3

condensation

Arrow 4

freezing

PART 2 • RUN THE MODEL

1. **evaporation** (Which process changes liquid water into water vapor?)
2. **liquid water** (Which stage comes right after water vapor in the model?)
3. **melting and evaporation** (Which two processes happen when water gains energy?)

TEST THE MODEL (SAMPLE ANSWERS)

- It leaves out where the water is, such as a lake or cloud.
- It leaves out how sunlight and cooling change the energy of the water.

The cycle is ice, melting, liquid water, evaporation, water vapor, condensation, liquid water, freezing, ice.

Melting and evaporation require energy gain, while condensation and freezing occur as water loses energy. Before the activity, check the student question/predictions/amount/container plan; provide shallow plastic containers, ice, water, clock, safe thermometers, freezer access and extra paper. Adults handle freezer placement/retrieval and spills; children observe/record rather than copy expected results.

A: room-to-ice energy transfer permits melting, solid to liquid. B: energy leaves water in the freezer, liquid to solid. C: declining marked water level over sufficient time supports liquid-to-gas evaporation; water vapor itself is invisible, so do not claim it was seen. D: new droplets outside a dry cold cup are air water vapor condensing and losing energy to the cold surface; they are not water leaking through the cup.

Teacher distinguishes inside meltwater from outside condensate. Require four dated before/after records and explanations linked to the model, accepting delayed/no detectable change and continuing checks when appropriate. Use temperature readings as additional evidence, not a rule that temperature must change during the transition. This is observed state-change evidence with an inferred energy direction, not direct sight of energy.