NaRiKa

User's manual

Coriolis Force Experiments

Cat. No. H45-1423-WO

Thank you for purchasing NARIKA products.

Please read this instruction manual carefully to ensure the correct and safe use of this product.

Please keep this manual in a safe place so that you can refer to it whenever necessary.

Safety Precautions

⚠ Warning: May cause death or serious injury.

〇Do not disassemble, repair, or modify the product. Doing so may result in damage to the product.

〇Do not use the product if you notice any abnormality or malfunction.

For repair, etc., please contact our distributor or the support center described in this manual.

〇Before experimenting, the instructor must explain the operation of the device to the students/children.

⚠ Caution: Contents that may cause minor injury or property damage.

〇Do not conduct experiments on unstable or unlevel surfaces.

〇Do not allow students or children to use the apparatus alone.

〇Do not move the instrument in an unstable condition.

〇Do not drop the product or subject it to strong impact.

〇Check the condition of the product before and after long-term storage, and discontinue use if any abnormality is found.

〇Avoid using solvents such as ethanol for cleaning or disinfection, as they may cause damage or appearance loss.

〇Check the surrounding environment and equipment carefully to avoid water damage when transferring the product filled with water during or after the experiment.

Introduction

Purpose and Features of this Product

This product allows you to visually and repeatedly observe how the Coriolis force works.

The equipment enables observation of directional changes in a fine water stream emitted from a handheld tank, as the user rotates clockwise or counterclockwise.–

When an object (e.g., wind) moves onto a rotating body, such as the Earth, without being affected by the movement of the Earth's surface, it is subject to a force that tries to bend its path. This is called the Coriolis force and is the reason why typhoons and cyclones swirl. In this experimental apparatus, you can check which direction the water (wind) is bending by rotating the water from the water tank around yourself as if it were wind.

What you need to know

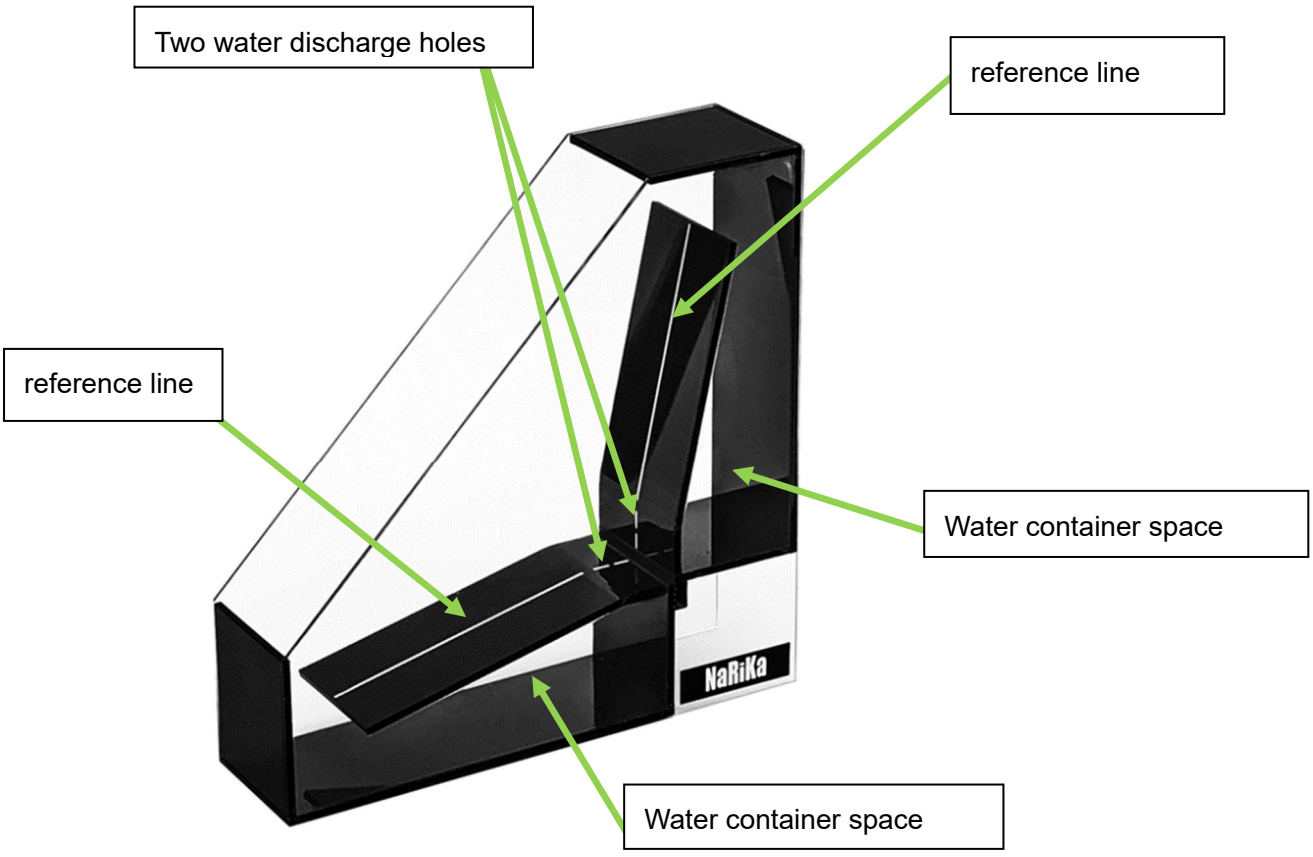
This product is made entirely of acrylic resin. If solvents such as ethanol are applied to the surface, small scratches will occur, and the product will be damaged. Do not use solvents to clean the product.

Product Specifications, etc.※Product specifications are subject to change for improvement. Please note that specifications are subject to change without notice.

Part Names and Product Specifications

Overall Size ：200×200×54mm

material properties： acrylic resin



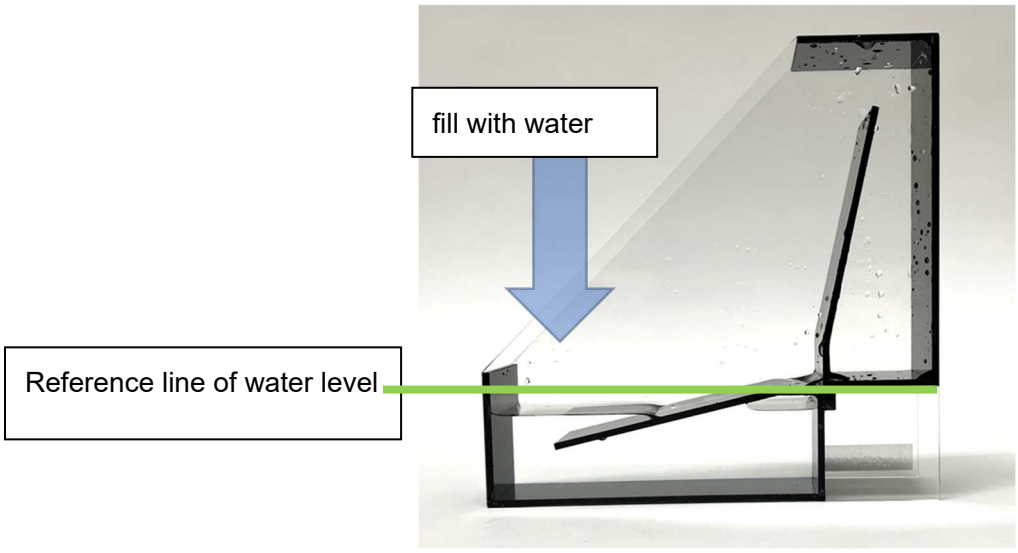
Way to use

Operating Procedure

1.Preparation and basic operation before the experiment

1-1. Fill the water tank section with water.

Fill the water tank section on one side with water using the line in the photo below as a guide.

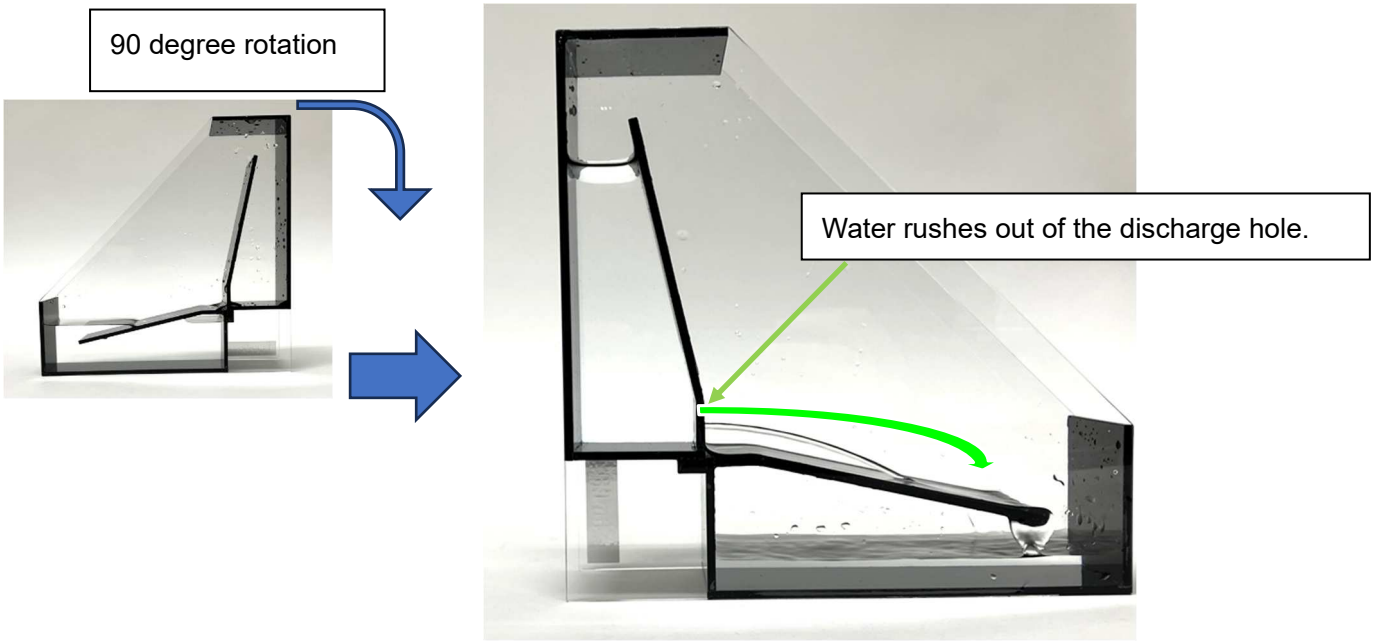


1-2. Discharging water

Rotate the water tank section filled with water 90 degrees. Check whether water comes out of the water discharge hole.

The discharged water flows into the other tank along the reference line.

Experiment while paying attention to the trajectory of the discharged water and the reference line currently.



2. How to use

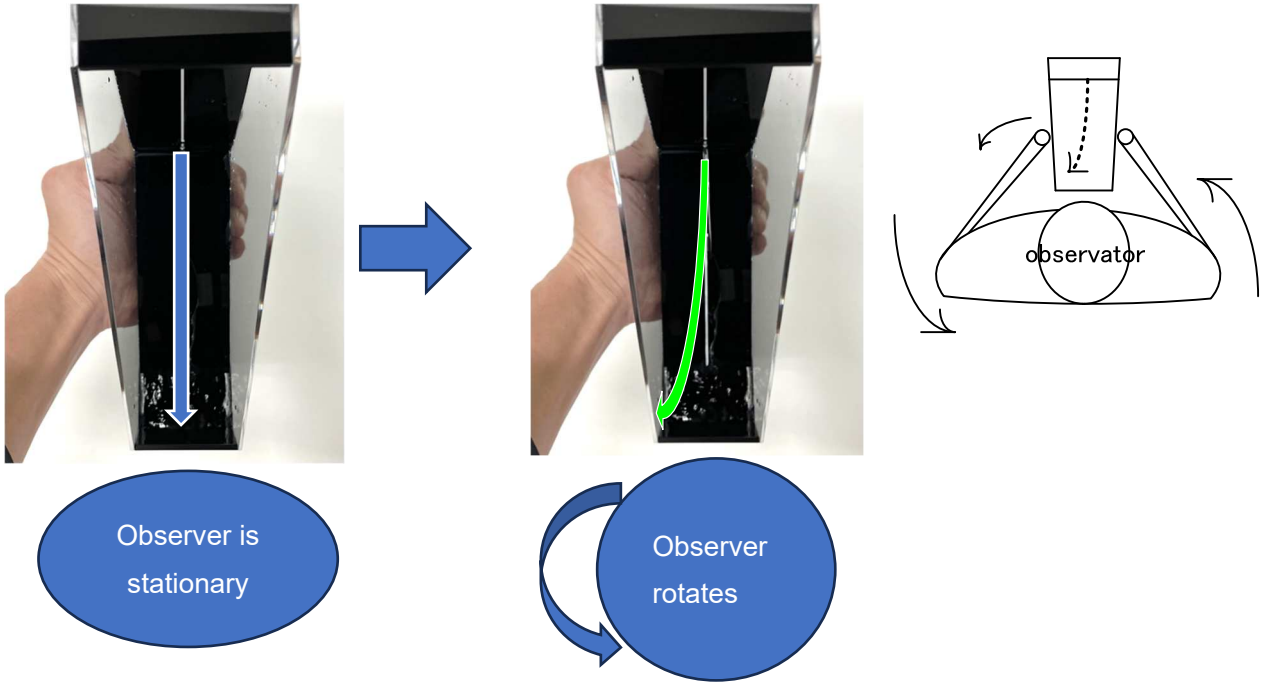
※During the experiment, the observer rotates and moves while holding the product. Please make sure that there are no objects around you that might bump into the product, and experiment in as wide a space as possible. Also, be careful of the effects of water exposure.

※It is easier to conduct comparative experiments if the direction of rotation is specified as counterclockwise only.

2-1. Rotate around to the left around yourself with the trajectory of the water in the direction toward you.

Perform the water-discharging operation 1-2, making sure that the trajectory of the water is in the direction toward you.

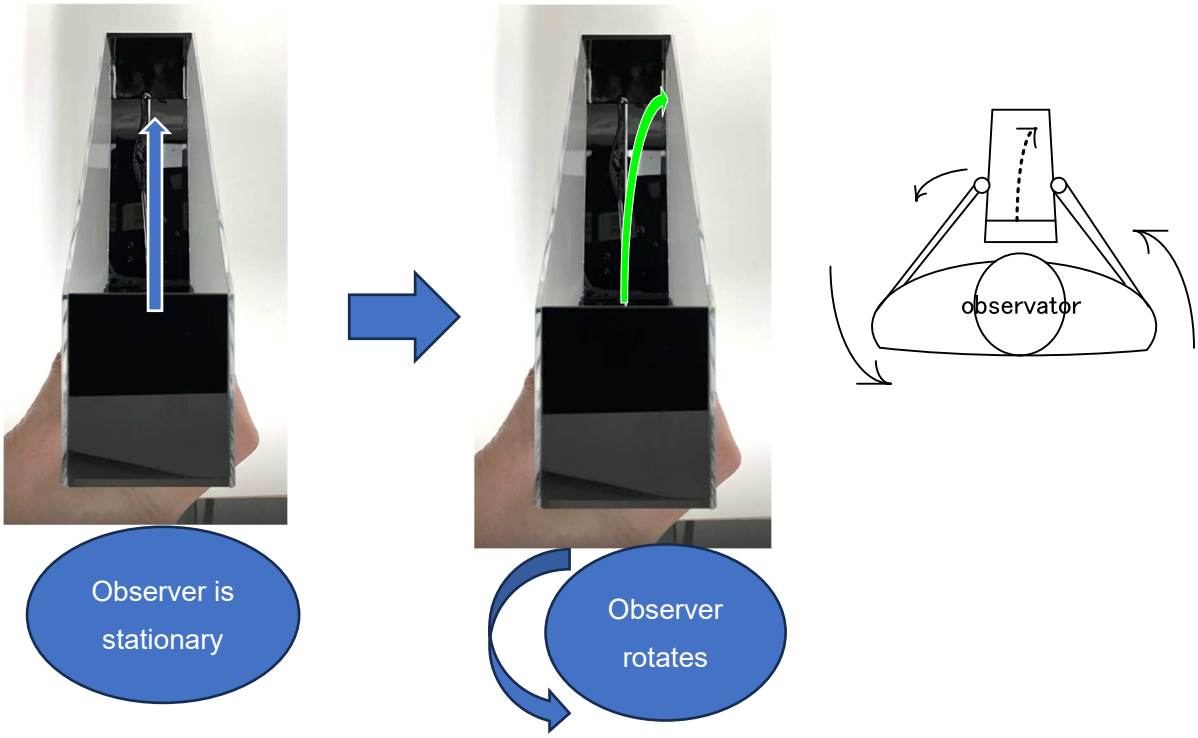
While paying attention to the trajectory of the released water and the reference line, hold the experimental apparatus in your hand and rotate it around to the left with yourself at the center while holding it steady. At this time, you will observe that the trajectory of the water bends to the left from the reference line.



2-2. Rotate around left around yourself with the trajectory of the water in the direction away from you.

Perform the water-discharging operation of 1-2, making sure that the trajectory of the water is in the direction away from you. While paying attention to the trajectory of the released water and the reference line, rotate around to the left around yourself while holding the experimental apparatus in your hand and fixing it.

At this time, you will observe that the trajectory of the water bends to the right from the reference line.



2-3. From experiments 2-1 and 2-2

Repeat experiments 2-1 and 2-2.

The results show that if the observer rotates to the left around himself, the trajectory of the discharged water is always bent to the right relative to the direction of flow.

If we replace the observer's rotation to the left with the rotation of the earth in the northern hemisphere, we find that the trajectory of the water flow is always bent to the right from the direction of travel in the northern hemisphere.

If we replace the water flow with the wind, we find that it is always bent to the right to the direction in which the wind blows (Coriolis force), which causes typhoons to swirl counterclockwise in the Northern Hemisphere.

3.Post-Experiment Cleaning

3-1. After use, drain water, dry, and store away from direct sunlight (ultraviolet rays).

Other Information

【Other Experimental Examples】

① Experiments to see which way the wind (water flow) bends in the southern hemisphere (rotation direction is clockwise).

By performing Experiments 2-1 and 2-2 with the observer rotating to the right, it is possible to observe which way the wind bends in the southern hemisphere.

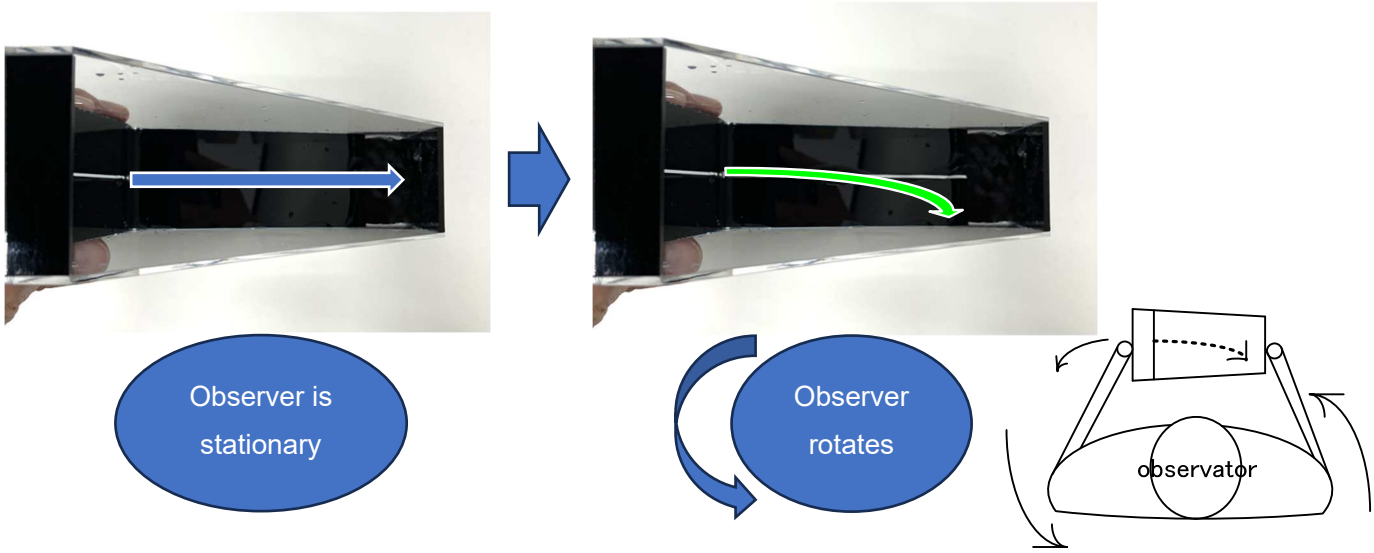
② An experiment to observe in which direction the wind (water flow) heading east, west, south, and north is bent by the Coriolis force, respectively.

By performing the same operations as in Experiments 2-1 and 2-2 with the direction of the water flow parallel to the observer, one can observe the force exerted on the wind moving in the east-west direction. If the water flow is to the left, the wind is to the east along the meridian; if to the right, the wind is to the west.

For a north-south wind, the water flow is observed at right angles to the observer, as shown in Experiments

2-1 and 2-2.

As in the results of Experiments 2-1 and 2-2, we see that the water flow turns to the right in the direction of travel.



③ An experiment to confirm that the Coriolis force does not work at the equator

Observe the trajectory of water while holding the experimental apparatus in your hand and moving it horizontally parallel (not rotating) while performing the water discharge operation in Experiment 2-2. At this time, you can observe that the trajectory of the water does not bend at all.

※It is easier to observe that the water does not bend if you move a relatively long distance.