

# 611-1280 (25-105) Liquid Accelerometer

## Warranty and Parts:

We replace all missing or defective parts free of charge. All products guaranteed free from defect for 90 days after sale, defined as 90 days after date of invoice. This guarantee does not include accident, misuse, or normal wear and tear.

## Introduction:

What happens to the oceans under the full moon? What flings you outward when your car cuts a corner too sharply?

It's easy to visualize the effects of inertial movement with this practical device. Horizontal acceleration creates characteristic wave patterns to demonstrate inertial movement. Now, because liquid moves in the direction opposite to the acceleration, you can actually "see" these waves by watching the pattern created by colored liquid.

You can even measure the patterns with the imprinted horizontal and vertical grid.

## Other materials needed:

- **Food coloring**  
Color the liquid inside the accelerometer so its movement can be seen
- **Dynamics Cars**  
We recommend **611-1310** Dynamics Car pair manufactured by **Science First®**
- **Inclined Plane**  
We recommend **615-4095** Inclined Plane manufactured by **Science First®**
- **Rotating Platform**  
We recommend **611-0200** Rotating Platform manufactured by **Science First®**

## Study acceleration with liquid accelerometer

### Concept:

Motion causes liquids to react in different ways.

### Purpose:

To illustrate the behavior of the liquid inside the accelerometer in reaction to different sequences of movement.

### Set-up:

Fill the cavity of the accelerometer with water leaving a small air bubble. Add food coloring so the water level is visible.

Mount the accelerometer on a Dynamics Car using the velcro attachment kit. Fasten the sticky side of the velcro tab to the top of the Dynamics Car at the desired location. This connects with a corresponding tab permanently affixed to the bottom of the accelerometer.

### Background:

The accelerometer is one of the best devices available to demonstrate kinesthetically the meaning behind various terms used to describe motion. An accelerometer detects changes in **velocity** (called **acceleration**) and is produced by a **force**. The level of the liquid remains level so long as no force is present - for example, the speed remains constant the travel is in the same direction. Standing still produces the same reading as running fast or slow at constant speed.

The liquid makes an "arrow" which always points in the direction of the force that is being applied to produce the change in motion.

This force always points toward the center of a circle. (Such forces are called **centripetal** forces.)

When the liquid accelerometer is accelerated, the liquid inside it moves in the direction opposite to the acceleration due to the principle of inertia.

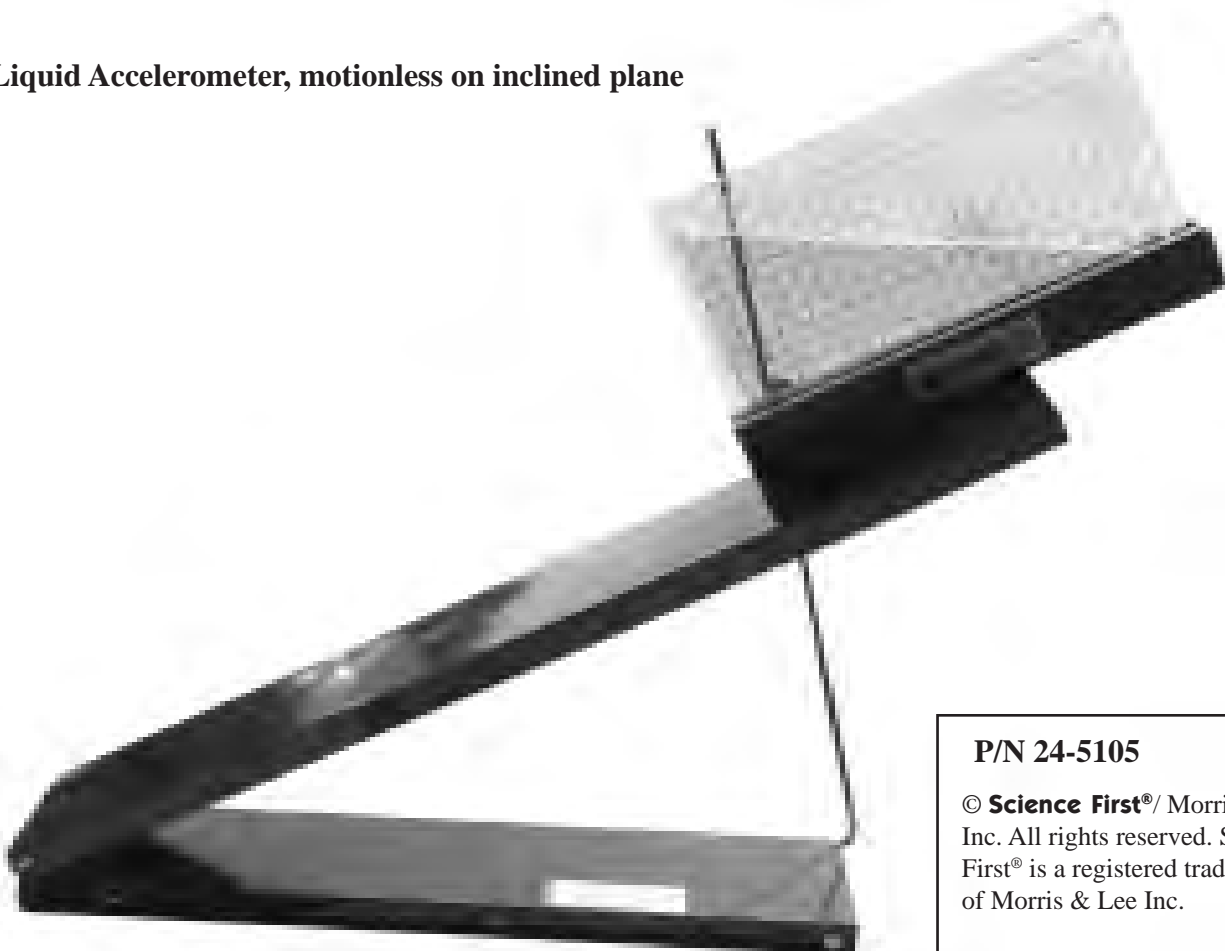
### Procedure:

1. Push the Dynamics Car on a flat surface. Watch what the liquid does inside.  
Q: What happens to the liquid?  
A: The level of liquid remains parallel to the flat surface on which the car travels. This is no different from the liquid's level if the accelerometer does not move at all.
2. Hold the accelerometer motionless at the top of the inclined plane. (See *Photo 2* on page 2.)  
Q: What will happen to the liquid?  
A: The liquid moves downhill.
3. Allow the Dynamics Car with Accelerometer to accelerate down the inclined plane.  
Q: What will happen to the liquid?  
A: It lines up with the surface of the water parallel to the inclined plane, as illustrated in the photo below.
4. Mount the unit on the center of a Rotating Platform using the velcro attachment kit. Spin the Platform at a constant rate. (See *Photo 1* on Page 2.)  
Q: Is there acceleration? What happens to the fluid?  
A: The liquid accelerated due to a change in direction. The level of liquid goes from horizontal to a "U" shape. The liquid in the accelerometer has been pushed to both sides.

### Liquid Accelerometer on rotating platform



### Liquid Accelerometer, motionless on inclined plane



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