

# but what are Gizmos?

ExploreLearning **Gizmos™** are award-winning simulations that bring research-proven teaching strategies to life for **New York City teachers** and make learning fun for **New York City students**.

Try them online at <http://www.ExploreLearning.com>.



- Students use Gizmos to interact with and explore hundreds of Math & Science topics, ranging from heredity to trigonometry.
- Teachers use Gizmos as dynamic “what if” tools to help students move beyond memorizing to true understanding.

## Inquiry-based lessons

Each Gizmo comes complete with a step-by-step, inquiry-based lesson that can be used as-is, or is easily customizable by teachers.

### Tides

Gain an understanding of high, low, spring, and neap tides on the Earth by observing the tidal heights and the positions of the Earth, Moon, and Sun. Tidal bulges can be observed from space, and water depths can be recorded from a dock by the ocean.

\*Click the Exploration Guide link to launch a step-by-step activity for this Gizmo.

[Exploration Guide](#)

**Exploration Guide: Tides**

Every day, tides ebb and flow along the seashore. At low tide, thousands of shorebirds flock to exposed mudflats, feasting on worms, crabs, and other delicacies. High tide brings relief to the inhabitants of tide pools. Sea anemones, barnacles, and mussels filter the water for plankton, while snails scrape algae off the rocks. Without tides, many of these organisms would not survive.

Like many daily events, tides are often taken for granted. But coming up with a complete explanation of tides was a challenge that engaged many great scientists, including Galileo and Lord Kelvin. Even today, predicting the tides with precision is a difficult task.

**Daily Tides**

In the Gizmo™, Earth and the Moon are shown. An observer is standing on the equator. Although it is not visible, the Sun is considered to be far off in space to the left.

- On the **SIMULATION** pane, notice the relative positions of the Sun, Earth, Moon and the observer. Select the **BAR CHART** tab, and click **Play** (▶). After 24 hours of simulated time, click **Pause** (⏸).
- As time goes by, what do you notice on the **BAR CHART** tab?
- Click **Reset** (↺), and then **Play**. When the water reaches its maximum depth, click **Pause**. This is **high tide**. What is the water depth at high tide?
- At what time did high tide occur?
- Press **Play**, and then **Pause** when the water is next at its minimum depth. This is **low tide**. What is the water depth at low tide?
- At what time did low tide occur?

- Click **Reset**. Notice that the **BAR CHART** currently shows high tide. Click **Play**, run the Gizmo for 24 simulated hours, and then click **Pause**. Select the **GRAPH** tab.
- How many high tides occurred in this 24-hour period?
- How many low tides occurred in the same period?
- Suppose it was high tide. About how many hours would you have

**Tides Gizmo**

**DESCRIPTION** | **TABLE** | **BAR CHART** | **GRAPH**

Day

h (ft)

20.0

15.0

10.0

5.0

0.0

Speed: Slow Fast

clock: 37 days 10 hours 0 minutes

controls: ▶ ⏸ ⏪ ⏩

**Correlation by State**

4.P1: The Earth and celestial phenomena can be described motion and perspective.

4.P1.1a: Earth's Sun is an average-sized star. The Sun is more than 100 times the diameter of Earth.

- Solar System
- Orbital Motion - Kepler's Laws
- Rotation/Revolution of Venus and Earth
- Solar System Explorer

4.P1.1c: The Sun and the planets that revolve around it are the other members include comets, moons, and asteroids. Earth's orbit around the Sun is elliptical.

- Solar System
- Gravity Pitch
- Orbital Motion - Kepler's Laws
- Tides

4.P1.1d: Most objects in the solar system have a regular and predictable motion. Explain such phenomena as a day, a year, phases of the Moon, eclipses, and comets.

- 2D Eclipse
- 3D Eclipse
- Eclipse
- Moon Phases
- Moonrise, Moonset, and Phases
- Ocean Tides
- Phases of the Moon
- Solar System
- Solar System Explorer
- Tides

**Assessment Questions**

1. Based on the diagram below, what type of tide is shown?

11:59 AM

**Assessment Questions**

5. A tide monitor was placed in the water and recorded data for several days before being broken by a curious seal. A graph was made of the data collected up to the time that the monitor was broken, indicated by the blue arrow. Which image represents the positions of the monitor, the Moon and the Sun at the time the monitor was broken? (Note: In each illustration the monitor is represented by a human figure.)

A. Image A

## Assessment & reporting

Students can check their understanding and get helpful feedback after every Gizmo. Teachers can use immediate results to guide instructional decision making.

## First-rate training

ExploreLearning training focuses on New York standards-based instruction and ensures teachers long-term success with Gizmos.

## Flexibility & ease of use

Gizmos are designed for success in computer labs, classroom settings with an LCD projector or interactive whiteboard, or even at home.

## Correlations to New York standards & textbooks

Gizmos are correlated to New York standards and textbooks, so finding the right Gizmo is a breeze.

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