

# OIMB GK12 CURRICULUM

2<sup>nd</sup> Grade

30-45 minutes

## TIDES

### Oregon Science Content Standards:

2.2 Interaction and Change: Living and non-living things change.

2.2P.1 Compare and contrast how objects and materials respond to magnetic forces.

2.2E.1 Observe and record the patterns of apparent movement of the sun and the moon.

2.3 Scientific Inquiry: Scientific inquiry is a process used to explore the natural world using evidence from observations.

2.3S.2 Make predictions about living and non-living things and events in the environment based on observed patterns.

### Ocean Literacy Essential Principles:

1. The earth has one big ocean with many features

### Goals:

- To introduce the concept of the tides and how they are caused by the moon's gravity.
- Have students act out the moon causing the tides.

### Concepts:

- At high tide the ocean comes up high on the beach and most of the sand and animals are covered by water.
- At low tide, the ocean is low on the beach and most of the sand and animals are not covered by water.
- Along the Oregon coast there are two high and two low tides each day.
- The moon's gravity pulls the earth's ocean. This creates a bulge of water on the side closest to the moon, and because of the spinning of the earth, also on the side opposite the moon. This bulge makes the high tides.

### Materials:

- PowerPoint or pictures of high tides and low tides
- something soft to drop on the floor
- 2 magnets
- Cutouts or models of the moon, earth, and water (or just draw them on the board)

### Lesson Plan:

1. Start with the students imagining that they are at the beach and the tide is very low so there is a lot of room to play. Have the students pretend to fall asleep for 6 hours. When they wake up, the ocean is at their toes, getting them wet. What has changed? (high and low tides) Show the students pictures of low tide and high tide. Ask them what is different (the amount of water, what they can see, etc.).

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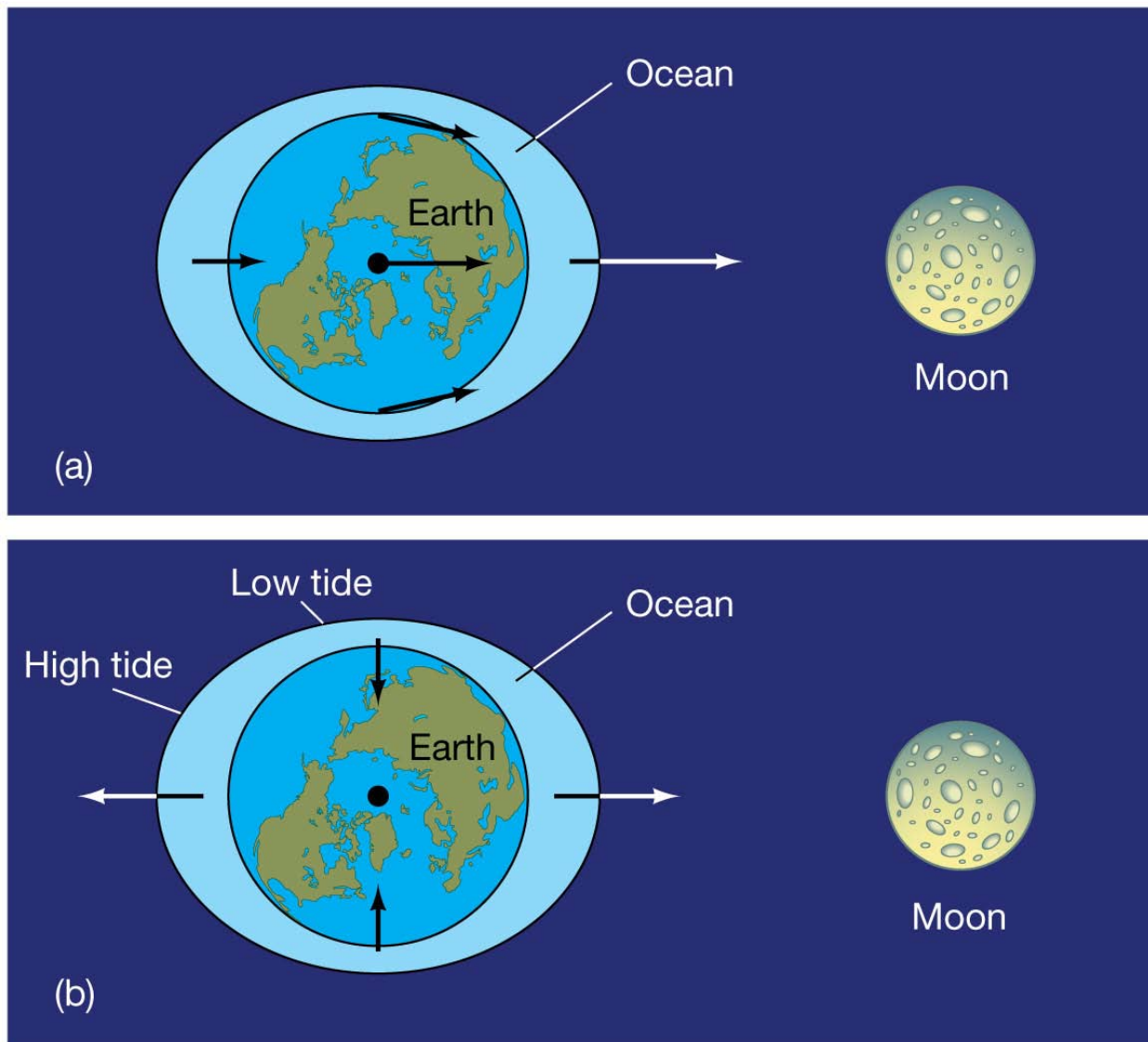
2. Draw a picture of the beach on the board and have students come up and mark where the water would be during high and low tide. Discuss what happens to the animals at high and low tide.
3. Now talk about how tides are made. Tell them the moon causes the tides. Drop something soft on the floor and ask the class what made it fall to the ground. Discuss gravity as objects being pulled to one another like magnets (demonstrate with pos/neg poles). Ask if the moon's gravity could pull the earth to it and go over why not (too big, pulled also by the sun's and other planet's gravities). The moon's gravity does pull the water on the earth (make sure they don't think it pulls the water off the earth).
4. Show a drawing of the earth and the moon, and how the water bulges at the spots in line with the moon. Tell them that we would expect the earth's ocean to be a perfect circle around the earth, but the moon's gravity pulling on the ocean makes a different shape (draw bulges in line with the moon, low perpendicular to the moon). Ask if these bulges would be high or low tides (high). Then draw an x on the earth perpendicular to the moon. Ask what the tide would be like there (low). Continue until this concept is understood.
5. Ask if the earth spins and how long it takes to go one whole turn (one day). Use a globe to show the earth spinning, and show how the x moves to two low tide spots and two high tide spots during the day. Continue until this concept is understood.
6. Ask if the moon moves around the earth. Is the moon always full? Would it pull water wherever it moves? Move the earth and the water around the earth so that the bulge of water moves too. Have volunteers come up and one move the moon and another move the water.
7. Have the students act out making the tides. Have one student be the earth, one be the moon, and four people together be the ocean (in line with moon and perpendicular to moon around the earth). Have the moon pull some of the ocean students out as a bulge on the two sides, and the other students squeeze in to the earth to represent the low tides. Have the earth spin slowly and stop at each ocean student. Have the class yell out if it would be low or high tide.

**Assessment:** Listen for student responses during the activities.

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Background Reference Figure:



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