



Water Slides

Virtual Instruction Lesson Plan

Episode 2: (13:39–26:46)
bit.ly/steamcamp-water-slides

Visit Cowabunga Bay to learn more about the science and engineering behind water slides.

Related Nevada Academic Content Standards/ Next Generation Science Standards:

- K-PS2-1.** Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- K-2-ETS1-2.** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- 3-5-ETS1-1.** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-3.** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Tip: This lesson plan is easily adaptable for face-to-face instruction. Simply conduct the “Explore” portion of the lesson as a hands-on activity in the classroom.

Materials

- Paper/pencil
- Tape
- Glue
- A small object, like a ping pong ball or marble
- Cup of water
- Small bowl
- An assortment of items to use for building a water slide, such as:
 - Toilet paper or paper towel tubes
 - Cardboard boxes
 - Plastic wrap
 - Straws
 - Plastic cups
 - Be creative and see what else you can use!

Engage:

Share the beginning of the program with students. After Zinnia asks, “I was wondering, how do water slides work?,” pause the program and ask your students the same question. Write this essential question down and record student responses to reveal students’ current knowledge, connections to the topic, and further questions they have.

Explain:

Introduce the words: **friction**, **energy** and **pump**.

- Have students guess their meaning and record their ideas.
- Ask students to listen for the words as they watch the video clip, featuring Science Mom and Sharaf Chenault, Cowabunga Bay’s Director of Sales (14:14 – 18:54).
- When they hear one of words, encourage students to make a gesture, such as wiggling their fingers.



Water Slides

Virtual Instruction Lesson Plan

Episode 2: (13:39–26:46)

bit.ly/steamcamp-water-slides

Explain, continued:

Pause the video at key spots to ask questions that strengthen comprehension and help children make connections.

- Pause the video at 15:08 and replicate Science Mom's experiment, with a cookie sheet and objects of varying sizes. Have student's guess which object will reach the bottom first. Emphasize Science Mom's points:
 - The higher something is the more potential energy it has.
 - The heavier object will slide first.
 - The smoother the surface, the less friction it has.
- Pause before Science Mom and her family try to slide down the dry water slide (15:30). Have students predict what will happen and explain their reasoning.
- Pause after Sharaf talks about the wave pool and the Surfin' USA slide (17:38). Ask students to share the different ways Cowabunga Bay uses pumps.
- Pause after Sharaf discusses the materials used to construct water slides (18:12). Why is fiberglass and steel used?
- Watch the "What did we learn?" segment to reinforce the concepts.

Reflect on the new knowledge students have acquired.

- Revisit the essential question and have children answer it by incorporating the vocabulary words; ask children to share any new information they acquired or additional questions they have.
- Have students explore friction with their hands (activity courtesy of the **Science Matters** – bit.ly/sciencematters-friction): "Have your students rub their hands together quickly. It doesn't take much hand rubbing to notice a warm feeling. Now put a small squirt of lotion (stick to unscented stuff for this) in each student's hand. Have them rub their hands together again – much less heat is generated. The lotion acts as a lubricant – it helps fill in some of the bumps and ridges on the surface of the hands, resulting in less friction and therefore less heat." Help students make connections between the activity and the video by pointing out how the lotion acts just like the water on a water slide to reduce friction.

Explore:

Share the at-home activity segment in which Jessica outlines directions for creating a water slide at home using everyday items (18:55–22:35). Then, guide students through the engineering design process outlined in the segment.

Define the Problem: Design a water slide that doesn't leak or spill water of materials you find around your house. It also has to be strong enough to hold the water and a small object sliding down it.

Imagine and Plan: Gather different recyclable materials, like toilet paper or paper towel tubes, cardboard boxes, plastic wrap, straws, and plastic cups. Encourage them to be creative!

Students will also need a small object, like a ping pong ball or marble. Have them hold the object in their hand to feel how heavy it is. Then, have them compare the strength and weakness of the items they chose. How are they going to use them in their design? Are they going to be strong enough to support their object? Have students draw a sketch of their design before they start.



Water Slides

Virtual Instruction Lesson Plan

Episode 2: (13:39–26:46)

bit.ly/steamcamp-water-slides

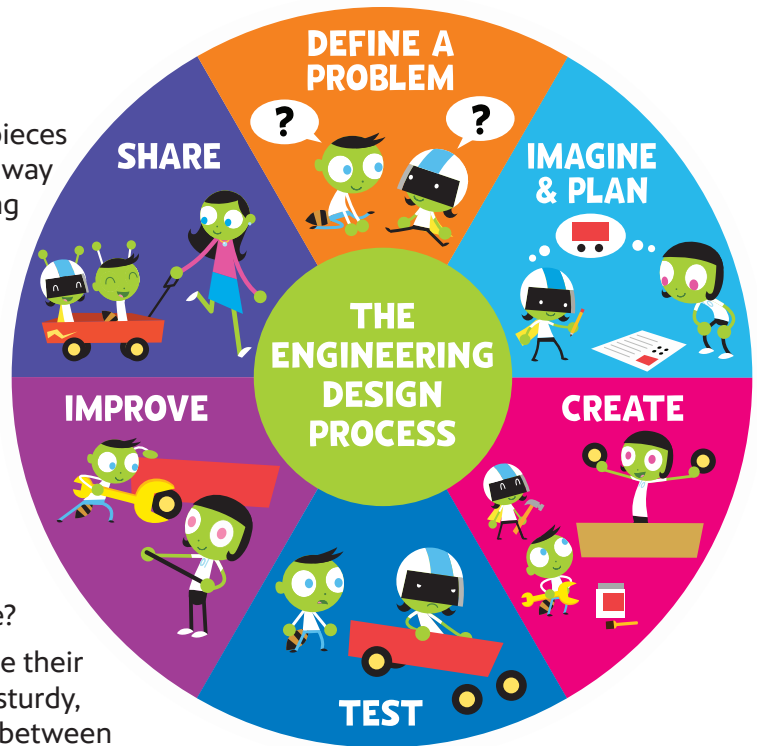
Explore, continued:

Create: The next step is to create their water slide. Encourage students to take their time and test the pieces as they go. Testing your project as you go is a good way to save time and fix mistakes if you realize something isn't working.

Test: Have students test their water slide. Gather a bowl to collect the water at the end of the slide. Ask the children to have a grown-up or sibling slowly pour water down the slide as they release their object.

Improve: If students tested their water slide and it leaked or didn't work as planned, have them improve their design and test again. If it did work, find a bigger object to test. How much water is needed for the larger object to move down the slide?

Communicate and Collaborate: Have students share their designs. Which materials were better at creating a sturdy, waterproof slide? Help students make connections between anything they learned in the video and this activity. What new questions do students have? Encourage students to share photos and videos of their at-home challenges with Vegas PBS at bit.ly/steamcamp-share.



Extend:

View the book talk with Shana, a local Young People's Librarian (23:23 – 26:08). If possible, share one of the books Shana previewed with students (**Focus on Friction** by Joanne Mattern; **Water Park: How Did They Build That?** by Nancy Robinson Masters; **Amusement Parks and Water Parks** by Joanne Mattern).

Encourage students to continue exploring water slides and friction by accessing the following PBS KIDS resources:

- **DragonflyTV: Water Slides**
bit.ly/dragonflytv-slides
- **Sid the Science Kid: Slide to the Side (Friction)**
bit.ly/sidsciencekid-slide
- **Friction Racing: Science Crafts for Kids**
bit.ly/ruffruffman-friction
- **The Cat in the Hat Knows a Lot About That!: Fact and Friction** – bit.ly/catinthehat-friction

