kinetic karnival
fluid flow & friction

In this episode, Jearl debunks the drain swirl myth from the bathtub, describes an early dating disaster, explains the tablecloth trick, and hangs a spoon from his nose.

Science is not something that always must happen in a science classroom. It is the way the everyday world works—the world in which you live, play, and die. Kinetic Karnival is about that world, from its commonplace phenomena to its bizarre features.

The show opens with a revealing look at the tale about bathtub drainage. Many people believe that bathtubs in the Northern Hemisphere drain only in the clockwise sense and just the opposite rotation is seen in the drainage of tubs in the Southern Hemisphere. The tale is just false. An explanation is given and then extended to the real-world example of hurricane rotation.

The show continues with other examples of curious fluid flows. Secondary flow is a flow normally unnoticed in a rotating fluid such as stirred tea. The flow of the fluid around the center and over the bottom of the cup creates pressure differences in the tea.

Benard cells are circulation cells created in a fluid when the top portion is cooler than the bottom portion. Benard cells in the coffee can be seen when the coffee throws up a fine mist which reflects the light. Dark cell borders appear where the coffee has cooled by evaporation.

Sometimes when a fluid pours from a container without a spout, the fluid doubles back on the lip and runs along the undersurface of the container. This once happened to me (Jearl) on a date.

Friction occurs when two surfaces try to slide over each other. The show outlines the nature of friction for the static and dynamic cases. Once sliding begins, the size of the frictional force usually decreases, a fact that is important in the braking of a rapidly moving car. It is also important in the demonstration involving the table cloth being pulled from beneath a set of dishes.

The show ends with the curious phenomena of the spoon, the nose, and the molecular adhesion of a thin layer of water.

Jearl Walker

Professor of Physics • Physics Department

BUBBLEBATH JEARL

1. Which moves faster in its circular path around the Earth?

A. A little piece of Texas **B. A little piece of Canada**

C. A little piece of Texas moves with the same speed as a little piece of Canada

2. The name of the ficticious force that deflects the ball thrown from Canada to Texas is

A. Coriander **B. Kittie Margolis** **C. Centrifugal**

D. Coriolis **E. Centripetal** **F. Mark McGuire**

3. What percent of bathtubs swirl counterclockwise in the Northern Hemisphere?

JEARL'S FUTURE IN TEA LEAVES

4. Which diagram below correctly shows the nature of secondary flow? (Each diagram shows a side view of the tea leaves bowl.)

A. **B.** **C.** **D.**

JEARL AND A BOTTLE OF BEER

5. When the bottle remains at rest on the table, Jearl's push is being matched by

A. dynamic friction **B. kinetic friction** **C. static friction** **D. Marsha's shove**

6. When friction transitions from static to kinetic, the amount of friction force

A. increases **B. decreases** **C. remains constant**

7. Tire tracks are made of _____ _____.

8. The best air temperature for ice skating is (water freezes at +32°F)

A. –125°F **B. –25°F** **C. +25°F** **D. +125°F**

JEARL WORKS MAGIC

9. To successfully pull off the tablecloth trick, you must

A. transition from dynamic to static friction as quickly as possible

B. transition from static to dynamic friction as quickly as possible

C. transition from kinetic to dynamic friction as quickly as possible

D. transition from sliding to kinetic friction as quickly as possible

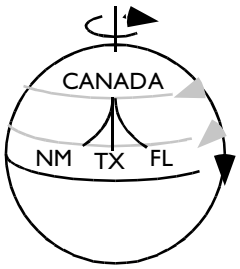
BORN WITH A SILVER SPOON ON HIS NOSE?

10. What is Jearl's personal spoon-hanging record?

BUBBLEBATH JEARL

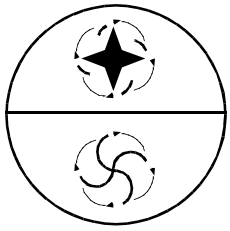
1. Because of the Earth's rotation, a ball thrown due south from Canada to Texas might land in

A. Texas
B. Florida
C. New Mexico
D. Michigan



2. Which diagram most accurately depicts the rotation of hurricanes?

A.



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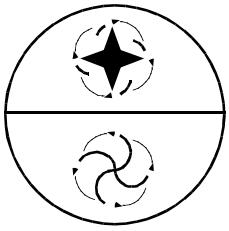

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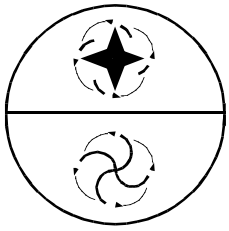
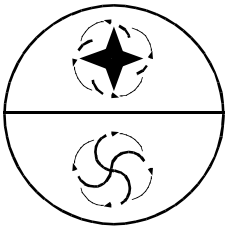


D.



3. What percent of bathtubs swirl counterclockwise in the Northern Hemisphere?

JEARL AND A BOTTLE OF BEER

4. What happens to the fluid pressure when the beer flows around the neck of a bottle of beer, and how does that pressure compare to atmospheric pressure?

5. When the bottle slides across the table, the type of friction force acting is

A. dynamic friction **B. kinetic friction** **C. sliding friction**
D. All of these names are correct **E. None of these**

6. When friction transitions from static to kinetic, the amount of friction force

A. increases **B. decreases** **C. remains constant**

7. Tire tracks are made of _____ _____.

8. When ice-skating, you glide on...

JEARL WORKS MAGIC

9. To successfully pull off the tablecloth trick, you must

A. transition from kinetic to dynamic friction as quickly as possible
B. transition from sliding to kinetic friction as quickly as possible
C. transition from dynamic to static friction as quickly as possible
D. transition from static to dynamic friction as quickly as possible

BORN WITH A SILVER SPOON ON HIS NOSE?

10. What is the name of the national contest Jearl would like to see?