

“GO WITH THE FLOW”

Teacher Name _____

Date: _____ MM/DD
M T W R F

Summary

Small (~1x1 inch) pieces of paper are used to track the flow of air into, out of, and around the box fan filter.

Part 1: The lesson begins with teacher-led questions about what will happen when paper is released at various locations, followed by experimentation, observation, and constructing explanations.

Part 2: students write their initials on small pieces of paper (construction paper, or colored with markers). With the fan off, all pieces are placed in the center of the fan and it is turned on high speed. After all pieces reach the ground, students search for their piece, and freeze at that location. Considering the fan as a clock with the handle at 12 and the power cord at 6, students determine the “time” associated with their location and report it by marking Xs around a clock drawn on the board. The locations of the Xs approximate the angular distribution of air flow from the fan. This is a statistical technique known as “sampling” that is used to detect patterns in seemingly random processes.

Connection(s)

Previous Learning:

Students are familiar with telling time on an analog clock.

Future Learning:

Instead of learning in which directions the air flows, explore proportional relationships by measuring distances paper travels on different fan speeds.

Instructional Plan

(Note: WC...whole class; CL...cooperative learning structure; PR...cooperative learning pair; IND...individual work)

- Predict then observe the motion of paper dropped near fan outlet WC CL PR IND
- Same for filter inlet (connect to virus particles trapped by filter)* WC CL PR IND
- Draw a picture of the box fan filter and use arrows to show air flow WC CL PR IND
- Everyone initials pieces of paper for Part 2 WC CL PR IND
- Paper release and search (in groups to scale down chaos?) WC CL PR IND
- Reporting times and discussion WC CL PR IND
- Reflection questions WC CL PR IND

Reflection...

Instructional Resource(s)

-  Box fan filter
-  (colored) paper or markers to facilitate finding
-  scissors
-  _____

What would happen to a piece of paper that starts out inside the box?

Why does the paper move when the fan is turned on? What is pushing it? Why does it swirl around?

*Do virus particles fall off the filter when the fan is turned off? No, because in the microscopic world, everything is “sticky”, so they remain in place.