



Step by Step Instructions

During instruction, adhere to a gradual release of responsibility. First, explain and model the strategy for students (me) and then have the class complete the strategy together (we). Next, put students into pairs to practice the strategy (two), and finally, have the students work independently to complete the strategy (you).

Extension

Build your own wind vane, windsock, or wind direction indicator.

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(WE). Next, put students into pairs to practice the strategy (TWO), and finally, have the students work independently to complete the strategy (YOU).

Engage (me):

Show students the short video clip of an aerial view showing a piping plover turning while on its nest. Video located at <http://plattebasintimelapse.com/ed/chapter/nests-eggs-chicks/> DO NOT show students the written description above the video clip. You want kids to generate various explanations about what they are seeing in the video. Create a list of ideas the kids generate as they try to explain/interpret what is happening.

Once you have piqued the students' interests and gotten them thinking, begin the explore portion of the lesson in which they will gain insight into what the video was displaying and use their new knowledge to explain and elaborate on tern and plover behavior.

If birds have an option, they will always take off into the wind and land into the wind, just like airplanes. Similarly, in order to protect their nests and keep them warm, they will always sit with their tail into the wind. This also keeps sand from blowing directly into their eyes. Sometimes birds will shift position to keep any eye on predators. Birds respond to environmental cues. During the course of a day, the pattern of a bird's movement indicates how wind is changing.

Explore (we/two):

Have students read through the story in the chapter Nests, Eggs, & Chicks. <http://plattebasintimelapse.com/ed/chapter/nests-eggs-chicks/> Pay attention to the following passage/explanation: *If birds have an option, they will always take off into the wind and land into the wind, just like airplanes. Similarly, in order to protect their nests and keep them warm, they will always sit with their tail into the wind. This also keeps sand from blowing directly into their eyes. Birds respond to environmental cues. During the course of a day, the pattern of a bird's movement indicates how wind is changing.*

Time: 30-45 min.

Materials:

- internet enabled
- computers,
- printer (optional),
- downloadable field journal for recording results

Grade Level:

Upper Elementary & Middle School

Subjects:

Science

Standards/Indicators:

Next Generation Science Standards:
MS-LS2-5

Resources:

Bird Vane Bingo Call Outs
Bird Vane Game Board

Meta Tagging:

Weather, wind vane, plover



(WE). Next, put students into pairs to practice the strategy (TWO), and finally, have the students work independently to complete the strategy (YOU).

Explore (we/two):

(continued from previous page)

<http://plattebasintimelapse.com/ed/chapter/nests-eggs-chicks/>

Discuss the following questions:

1. If the bird's head is facing north, which direction is the wind blowing? Answer: from the south since the bird faces away from the wind...the wind hits the tail first.
2. How do windsocks or wind vanes help tell the direction of the wind? Answer: since the wind direction is listed in cardinal directions, socks or vanes can give you a visual account of wind direction as it changes in real time.
3. How can observing a nesting piping plover indicate the direction of wind at any given time?

Move on to the activity in the Explain and Elaborate portion of the lesson.

Explain AND Elaborate (two/you):

Direct students to a game (which can be projected and completed as a class) called Birds as Wind Vanes. Students will examine several an aerial time-lapse video of a piping plover and attempt to answer the following questions. The teacher will project the grid pattern onto a screen using an LCD projector and/or print a copy for each student.

1. What is the wind direction for most of the day on 5-1-15?
 - Answer: Mostly from the East direction since 3 of the 4 birds have their tails toward the east direction.
2. Which days(s) was the wind out of the North?
 - Answer: None. The wind direction was never out of the North on any of the days data was taken.

Explain AND Elaborate (two/you):

(continued from previous page)

3. Explain the wind patterns and direction on 5-25-15.
 - Answer: The wind changed direction 4 times that day: southern, eastern, western and southern.
4. What other data would be important to have on the days provided on the chart and Why?
 - Answer: time of day, precipitation, location, and cloud cover are just some examples. Reasons could range from time of day indicating possible patterns between morning and afternoon; precipitation could indicate thunderstorm or other weather event; location could provide information about natural or manmade objects blocking or redirecting wind; cloud cover could indicate temperature or pressure changes.

Evaluation (you):

Students will be playing a version of the Bingo game with a printed copy of the Bird Vane Game board. You will also need to print the sheet called Bird Vane Bingo Call Out sheet.

Once you have the Bingo Call Out sheet printed, cut out the squares and randomly select one of the squares from a pile (or bag) and call out the wind direction. Students must indicate ONE and only ONE bird that represents that wind direction. Once a student has 4 birds marked in a row (up/down/diagonal) then that student wins the game. Check for understanding once the first “Bingo” has been announced. This is a fun and quick way to formatively assess student understanding.

Further discussion can be generated due to the fact that a few birds are NOT exactly southwest or southeast, but more south by southeast. This can be a learning opportunity to discuss accuracy, personal interpretation and standardizing units or methods of collecting data. Scientists have to agree on a universally accepted way of gathering and representing data so that accurate interpretations can be made.

Extension:

Have students build their own wind vane, windsock, or wind direction indicator. A wind direction indicator can be very easily and cheaply made from a tall stick or pole (such as a dowel rod or simply a long stick found outside) and a lightweight piece of brightly colored plastic or paper streamer. Paper will biodegrade and not harm the environment if it breaks loose and blows away. Plastic will photodegrade into smaller pieces and litter/pollute the environment if not picked up and disposed of properly.

Materials:

1. Stick or rod about 6 feet in height.
2. A strip of plastic or streamer paper at about 1-2 inches in width and 1-2 feet in length.

Locate an open area free from buildings and trees where the wind has an unobstructed pathway. Buildings and other objects will create turbulence and disrupt the normal wind direction, giving incorrect wind direction readings. Tie the strip of plastic or paper to the tip of the rod and secure rod into the ground. Students should be able to view the streamer from a classroom window or from a distance away from the wind indicator. Set times of day to record wind direction and track patterns. Students will be collecting quantitative data (numerical data that can be graphed) by recording wind direction, time of day, date, temperature, etc. Qualitative data can be collected by writing down the weather for that day such as raining, cloud cover, storms.