SCIENCE

Lesson 6

Prep

Topic: Investigating materials and properties

Investigating the effects of wind

Lesson concepts

- Objects are made of materials that have observable properties
- Science involves exploring and observing the world using the senses
- Questions can obtain responses
- Observations can be made using the senses
- Observations can be discussed and ideas can be represented
- Observations and ideas can be shared

Learning alerts

Be aware of students who only focus on the movement of materials in the wind, rather than how the material's properties are affected.

Suggested next steps for learning

- Ask students to observe the material in wind.
- After removing the material from the wind, focus on the appearance of the material: Does the material look different? How has it changed? (For example: it is tangled or torn; it is broken; it is the same?)

Today students will:

► understand that some materials are more suited to windy conditions than others.

Resources

Find and prepare

Sheet — Wind investigation

Sheet — Ollie's ornaments: Wind ornaments

Digital camera

Objects and materials that have been affected by the wind (for example: old flag, paper, plastic bag, rope, piece of clothing)

Set of materials that are likely to be available for making the wind ornaments (for example: aluminium foil, paper, tissue paper, crepe paper, fabrics, hard plastic, plastic bag, wool, cotton, newspaper, cardboard, wooden iceblock sticks, natural items)

Exercise book

Key terms

durable, materials, properties, strong, weak

For definitions and explanations of terms, please see the Glossary.

Lesson

Note

If you do not have a suitable fan, materials can be placed outdoors several days before the lesson. Alternatively, the lesson could be split into two sections and conducted several days apart so that the materials hopefully will be affected by some wind. Should either of these options not be viable, locate materials outside that have already been wind-blown (for example: rope, old paper, signs, plants, outdoor furniture, fabric) or use pictures like the flags below.

Discuss situations where things blow in the wind

Say to students

> We have already investigated what happens to materials when they get wet, just like a wind ornament would if it were outside and it rained. In this Science lesson, we will investigate what happens to materials when they are in the wind. Science involves observing things to learn more about them. You will observe materials blowing in the wind to learn how the wind affects the materials.

Focus questions

Q: *What objects have you observed that are blown by wind?*
A: For example: Trees, leaves, kites, hair, hats.

Q: *What have you observed happening to these things?*
A: For example: My hair gets really knotty, the trees bend and sometimes break, my hat flies off and I have to chase it, the wind goes under the kite and makes it fly, the leaves go everywhere.

Q: *What happens when the wind blows a flag?*
A: For example: It moves and flaps around.

Q: *Does a flag fall apart or break when the wind blows? Why or why not?*
A: For example: No, because it is made of strong fabric. It might when it's an old flag.

Q: *Why don't we make real flags out of paper?*
A: For example: Paper is not good for flags; the paper would tear in the wind and go soggy in the rain.

https://morguefile.com/p/761338

Erdenebayar, IMG_6761-2.jpg,
http://www.morguefile.com/archive/display/865728

Say to students

"We know that our homes are objects that have to withstand the wind. When people build homes they choose materials that are strong and tough and can stay together in very strong winds. We choose materials like bricks, concrete, wood and metal. We say these materials are **durable**."

Say to students

Durable means tough, long-lasting, and capable of tolerating wear and tear from actions that happen to the material as it is used. When people make objects which they know will be blown a lot in the wind, they need them to be durable. Science has helped us by testing and inventing durable materials for use in different situations. Some materials need to be used in very windy, very hot, very cold or very dangerous situations. Scientists do things such as test the ropes that rock climbers use to invent better and safer ropes, or test and invent safer parachutes.

Investigate the effects of wind blowing various materials

Say to students

We know that science involves making observations using our senses. In this lesson, we are going to observe how **durable** different materials are in the wind. Real scientists would observe the materials over many days and weeks but we only have a short time to observe. We are going to use a fan to make a strong wind and observe the effect on the materials closely.

1. Display equipment and materials.

Say to students

Before we begin, you need to make sure you follow some safety rules. Electrical appliances can be very dangerous and will injure you if you do not take care.

You must:

NEVER use an appliance without an adult.

ALWAYS ask an adult to help.

NEVER have wet hands when you touch an appliance.

ALWAYS make sure your hands are dry.

NEVER put your fingers into any moving or hot parts.

ALWAYS keep your body safe when using an appliance.

MAKE SURE an adult has switched the appliance off and unplugged it when it is not in use.

Focus questions

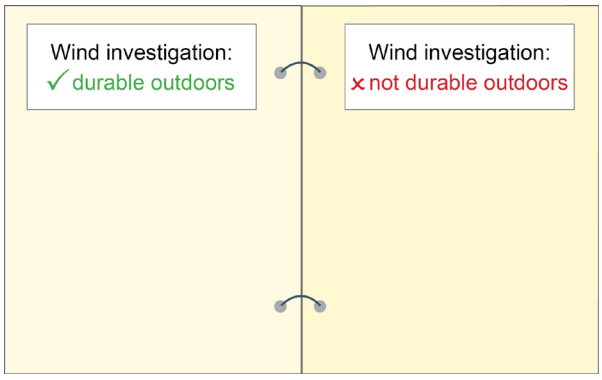
Q: *How do you think we might set up our wind investigation using the equipment we have here?*
A: For example: We can put the materials onto the drying rack and turn on the fan.
Q: *Will the samples stay on the rack themselves or will we need to do something?*
A: For example: We will need to peg them on.

a. Support student to peg samples to the rack or rope.
b. Set up the fan but do not turn it on.

Say to students

"While we are waiting for the wind to have an effect, you are going to predict which materials you think will be more durable based on their properties. Use your senses and sort the materials into two piles, ones that are durable outdoors and others that are not durable outdoors. I have some group labels to help you."

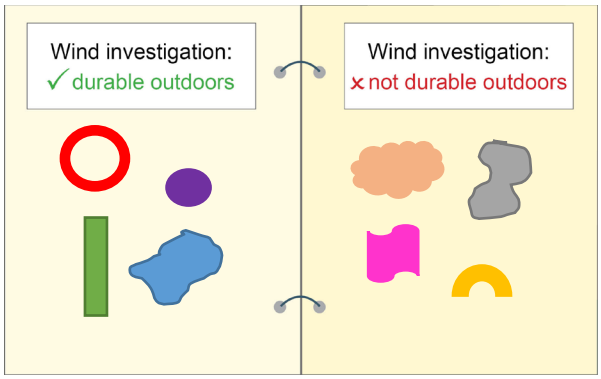
2. Display the two labels cut from **Sheet — Wind investigation**.
   a. Read and glue the strips into student's exercise book.



Say to students

"There is a second piece of each sample for you to observe. You can try gently pulling and shaking the material if you think it will help you to understand its properties, and make a prediction. Once you have observed the sample, place (don't glue) it on either the durable or not durable page. While you are doing this I will turn on the fan."

b. When student has finished sorting, point to the ✓ **durable outdoors** page.



Focus questions

Q: *What properties do the materials in this group have that make them durable outdoors?*
A: For example: Some are strong, some are thick, some are stretchy or don't tear easily.

Q: *What properties do the materials in the other group have that make them not durable?*
A: For example: They are weak, tear easily and are thin.

Say to students

"We are now going to check and see if there have been any changes to the materials yet."

c. Stop the fan.

Focus questions

Q: *Can you observe any changes in the materials yet?*
A: For example: Yes, the tissue and newspaper are starting to tear, the wool is twisted up.

Q: *Do you want to change how you have grouped any materials in your exercise book?*
A: Personal response required.

Say to students

"We know that wind ornaments must be durable in the wind and the rain, therefore we are going to give the sample materials a spray with water, to simulate (pretend to) rain, and turn the fan on to simulate wind."

3. Give students the spray bottle to spray all the materials on the rack.
   a. Turn the fan back on.

Determine the suitability of materials for windy conditions

4. We know that wind ornaments must be durable in wind and rain.
5. Display **Sheet —** Ollie's ornaments: Wind ornaments.

Say to students

Take a look and see if you think the wind ornaments are made from durable materials.

Now, we will stop the fan and observe the test materials again to see if they have been affected by the wind and water. Observe the materials and tell me about any effects.

   a. Stop the fan.

Focus questions

Q: *What changes can you observe in the materials?*
A: For example: The tissue and newspaper have torn in places, the wool is very knotted.

Q: *Do you want to change how you have grouped any materials in your exercise book?*
A: Personal response required.

Q: *Why do you feel this material should be in the other group?*
A: For example: I think it will fall apart soon and it won't be good outside.

Say to students

If there are any materials you now think should be in a different group, move the samples into the correct column in your exercise book as a record of your observations.

   b. Glue samples into your exercise book.

Say to students

This has only been a small amount of wind and rain over a short amount of time. Real scientists would do this investigation over a long period of time.