SCIENCE

Lesson 5

Prep

Topic: Investigating movement of objects

Exploring sliding and spinning

Lesson concepts

- The way objects move depends on a variety of factors, including their size and shape
- 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 exploring but not making scientific observations.

Suggested next steps for learning:

- Ask questions that help to focus observation, and encourage the use of scientific language and explanation.

Today students will:

- understand why some objects slide or spin and do so better than others.

Resources

Find and prepare

Sheet — Templates for spinners

Sheet — Movement word cards

Set of objects that spin or slide

Hoops or trays / baskets for sorting

Exercise book

Materials to make spinners (for example: stiff card, old compact discs)

Short pencils (~8 cm, not too sharp)

Long pencils (~17–20 cm, not too sharp)

Marbles small and large

Reusable adhesive putty

Scissors (cutting card)

Smooth table top (space for spinning)

Practical information

Before the lesson, cut out cardboard shapes using the template for spinners and push holes in them. Students can then cut and change the shapes during the guided investigation.

If concerned, push small holes through the spinners beforehand to avoid students poking themselves or others with pencils.

Use pencils that are pointed but not newly sharpened to avoid injury.

Key terms

observe, properties, senses

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

Lesson

Note

Ideally, spinning is introduced with a spinning toy of some type. During the lesson, students construct a CD spinner (photo). If no other spinners are available, premake a card or CD spinner and use this. Students can still make their own during the lesson.

Explore sliding and spinning movements

Say to students

“Let’s think back on our learning about how objects can move. We have learned that objects can move in different ways and the movement of an object is affected by some of its properties, especially its shape. Some properties of objects affect rolling and bouncing. Today, we are looking at sliding and spinning movements.”

1. Display a tissue box and a spinning object such as a top/spinner.

Focus questions

Q: *Do you think these items would roll or bounce well?*
A: Not the tissue box; the spinning top could maybe roll on its side but not well.

Q: *What movements do you think they would make?*
A: Personal response required.

a. Demonstrate a slide by pushing the tissue box across a smooth surface.

Say to students

“This is a slide. When an object glides smoothly across another surface, it is called sliding.”

Focus questions

Q: *Can you think of other things that involve sliding?*
A: For example: Sliding down the slide, sliding in socks on the wood floor, playing cards sliding across the table.

Q: *Why do you think objects can slide?*
A: For example: Because they are slippery, because they are smooth, because the bottom is flat.

Say to students

Objects that can slide usually have a particular property. They are shaped with a very smooth, flat surface that glides on many other surfaces. Or it might be that things glide on it. For example, something might slide easily on a smooth table but if you try to slide this object on the carpet it doesn't slide. The table was the object with the smooth flat properties. When you put two smooth surfaces together then things get very slippery, for example: an ice cube on a smooth tiled floor.

Now let us describe spinning.

b. Demonstrate a spin with the spinning toy.

Say to students

This object is spinning. When an object turns around and around or twirls on an axis or centre point it is called spinning.

Focus questions

Q: *Can you think of other things you have seen spinning?*
A: For example: A merry-go-round, ceiling fan, windmill.

Q: *Why do you think objects can spin?*
A: For example: They have a part down the middle that they turn around on.

Q: *When you turn a tap on or off would you say the handle was spinning?*
A: Personal response required.

Q: *What eventually happens when you keep turning the tap handle?*
A: It stops and you can't turn it on any further.

Q: *So what do you think the difference might be between a spin and a turn?*
A: A spin keeps going around and around whereas a turn does go around but it reaches a point where it stops and you have to turn it back the other way to make it go around again.

Say to students

There is a difference between turning and spinning. Turns usually have a stopping point, while spinning usually keeps going around and around. If you picture yourself **turning** the handle to open a door or **spinning** around and around on the spot, it will be easier to remember the difference. I'm now going to give you some objects to explore for spinning and sliding movements. Spend a few minutes thinking about why things can spin or slide.

c. Hand out a selection of objects that spin or slide or both for student to explore.

Classify sliding and spinning objects

2. Display three sorting trays and label with the word cards ‘slide’, ‘spin’ and ‘slide and spin’ from the **Sheet —** Movement word cards.

Say to students

“Now sort the objects into the group that best describes it: slide, spin or slide and spin. If any objects don’t spin or slide, put them in a group on their own. Then we will discuss your thinking.”

Focus questions

Q: *What properties do you think help an object to be good at spinning?*
A: For example: They have a spinning point in the middle of them; they balance on the spinner, a lot of them are circle-shaped.

Q: *What about properties of sliding objects?*
A: For example: They have at least one really smooth flat side.

Q: *Have you found many objects that did both, spin and slide?*
A: Personal response required.

Q: *Is there anything similar about the objects in the ‘slide and spin’ group?*
A: They are all flat and smooth on one side and circle shaped.

Q: *Look at the group of objects that don’t spin or slide. What do you notice about these objects?*
A: For example: They are rough and don’t have a flat smooth side, they aren’t a spinning shape.

Say to students

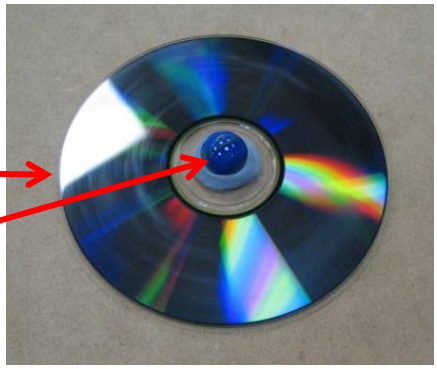
So, the sliding objects can be any shape really as long as one side is really smooth and flat. But the spinning objects have a similar shape. We are now going to do an investigation to see if shape really is an important property for spinning.

Investigate spinning

Say to students

You are going to make some different spinning objects and investigate the properties that affect spinning. The first type is made with an old compact disc, a marble and some reusable adhesive putty. The picture below is a finished one.

3. Direct student to assemble their spinner.
   a. Place the marble in the centre hole of the CD.
   b. Hold the edge of the CD up slightly, keeping the marble in place with your thumb.
   c. The marble pokes through the hole in the CD and sticks out slightly underneath.
   d. Shape the putty around the marble on the top side, also pressing it onto the CD.



   e. Grip the marble and putty in your fingertips and flick quickly to start the spinning.

Say to students

Have some turns at making it spin and observe closely as to why it spins so well.

   f. Student spins and observes.

Say to students

Now press a small ball of reusable adhesive putty onto the top of the CD somewhere towards the edge, like where the yellow dot is in the picture.

Predict what you think is going to happen.

Re-spin and observe what happens.

   g. Discuss effect.

Say to students

By adding the extra putty we have actually changed the shape of the CD, which has therefore affected the balance of the spinner.

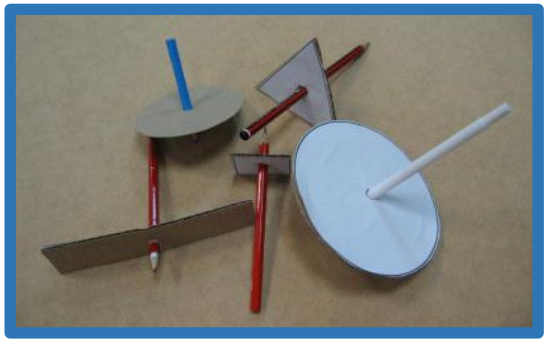
We are now going to investigate changing the properties of spinners in other ways.

4. Display the **Sheet —** Templates for spinners.

Say to students

We are going to make a different type of spinner using these shapes, some card and pencils. We will glue the sheet of spinner shapes onto a piece of cardboard to make the spinners a bit stiffer and stronger. Then we will cut them out and gently poke a pencil through the centre. We then twist the pencil quickly to make it spin. We may need to move the shape up and down the pencil until we get it to balance and spin.

Support student to make and test 2–3 spinners.



5. Explore the effects of:
   a. different-shaped discs
   b. positioning the disc higher and lower on the pencil
   c. making a new hole in one of the spinners that is not in the centre
   d. cutting a piece out of the edge or off the end of a spinner that works and observing the effect
   e. trying a different-sized marble in a cardboard spinner.

Focus questions

Q: *Now that you have investigated spinning, do you think you could make a spinner out of a pencil and a pancake? Why or why not?*
A: For example: No, because a pancake would be too floppy and it would probably break. The hole in the middle for the pencil would get too big very quickly or tear. Also, you couldn't make the pancake perfectly round to start with but I guess you could cut it.

Q: *What are the properties that an object needs to be a good spinner other than shape?*
A: For example: The material it is made from needs to be a bit strong and the disc needs to be a bit stiff.

Say to students

"Through this scientific investigation, we have been able to observe how the properties of a spinner affect how well it will spin. Shape is a very important property but what it is made from is also important. Sliding objects are also affected by their properties."

Represent observations

Say to students

"To finish this lesson, you are to open your exercise book and draw a spinner and an object that will slide. You can also draw an arrow to the parts of your objects that can affect how they move."