Spatial Reasoning Toolkit

Movement and navigation

Birth to 7 years

Children are learning to:
Explore space by moving, rolling, and stretching.

0-6 months

Children are learning to:
Develop an awareness of their own bodies, where distinct parts are and their relation to each other.

0-6 months

Children are learning to:
Engage with spatial relationships, positions and directions, using gestures and concepts like 'in', 'on', 'under', 'up', 'down'

6-12 months

Children are learning to:
Explore space by crawling and walking.

6-12 months

Children are learning to:
Investigate fitting themselves inside and moving through spaces.

1 to 2 years

Children are learning to:
Explore familiar environments, moving freely around and enjoying finding out about the world from new viewpoints.

1 to 2 years

Children are learning to:
Manoeuvre toys and themselves around objects and the environment.

2-year-olds

Children are learning to:
Find their way around familiar environments, e.g. where they wash their hands.

2-year-olds

Children are learning to:
Recognise and predict familiar routes e.g., says *garage* before they see it.

3-year-olds

Children are learning to:
Follow and give directions, including *left* and *right* turns when accompanied by gestures.

4- and 5-year-olds

Children are learning to:
Notice landmarks and use these to find their way around familiar places.

4- and 5-year-olds

Adults could:
Provide bags and boxes for items to be stored, hidden, and moved. Talk about what is *in* the bucket or taking it *over there*.

Spatial Language:
'into', 'up high', and 'over there'

6-12 months

Adults could:
Let babies play freely with their hands and feet, supporting developing body awareness through baby massage and songs like "*This Little Piggy Went to Market.*"

Spatial Language:
'where is it?', 'round' 'up' and 'down'

0-6 months

Adults could:
Provide stretches of uninterrupted time for babies to explore the spaces around them. Challenge babies to move or stretch towards objects that are just out of reach.

Spatial Language:
'too far', 'nearly'

0-6 months

This keyring includes typical spatial reasoning development and how adults can support this.

Please note:

- Ages are approximate
- Each child develops differently and at their own rate
- Ages are a guide and not expectations
- The stages build so earlier spatial learning continues to develop alongside new learning.

Adults could:
Provide opportunities for children to push/pull toys around, travelling through, over, down, and around. Model making simple obstacle courses.

Spatial Language:
'Upside down', 'over the top', 'through', 'lower down'

2-year-olds

Adults could:
Provide large spaces with a variety of levels and support discovery of a range of viewpoints e.g. looking at things from above or below.

Spatial Language:
'up higher', 'over', 'on top of' and 'upside down'

1 to 2 years

Adults could:
Provide access to tunnels, boxes and spaces where children like to hide, squeeze into and move through. Support with commentary and gestures.

Spatial Language:
'inside', 'through', 'under,' 'over' and 'fit into'

1 to 2 years

Adults could:
Play games that involve curling and stretching, popping *up* and bobbing *down*.

Provide opportunities to explore large spaces and large objects, e.g. play tunnels.

Spatial Language:
'inside', 'on top' and 'jump up/down'

6-12 months

Adults could:
Work with children to make linear route maps using wallpaper rolls and small world toys for landmarks. Ask children to think about walking a route '*in your head*' to recall the order of landmarks.

Spatial Language:
'first', 'then', 'next', 'alongside' and 'after'

4- and 5-year-olds

Adults could:
Encourage children to describe position, give directions and refer to landmarks, e.g. in small world play, or when following pathways or creating obstacle courses and treasure hunts.

Spatial Language:
'forwards', 'backwards', 'sideways' and 'turn'

4- and 5-year-olds

Adults could:
Talk about familiar routes, referring to landmarks and decision points. Demonstrate position and direction language.

Create walkways with children using stepping stones, planks or chalk lines.

Spatial Language:
'next', 'look under', 'after' 'before'

3-year-olds

Adults could:
Narrate different routes around their environment, emphasising position and direction, e.g. to find a hidden toy.

Provide outdoor toys for transporting objects, e.g. wheelbarrow.

Spatial Language:
'next to', 'behind' and 'all the way over there'

2-year-olds

Children are learning to:

Predict the path of travelling objects, using the language of position, direction, and orientation.

6- and 7-year-olds

Children are learning to:

Place things at approximately correct relative distances when creating maps or 3D models and identify representations of real-world features.

6- and 7-year-olds

Children are learning to:

Navigate simple routes. Plan a simple route in a familiar environment using landmarks.

6- and 7-year-olds

For children's book ideas related to movement and navigation visit

www.earlymaths.org/spatial-books

Birth to 7 years

The following print instrutions are based on HP printers. Refer to your printer's handbook for more detailed instructions.

Print on both sides of the paper (Windows)

1. Open the document, and then click File > Print.

2. Select your printer, and then click Printer Properties, Preferences, or Printer Setup.

3. From the print settings, select the option for a two-sided print job. Menu options vary by printer model.

Click the Layout, Features, or Finishing tab. Click the Print on Both Sides drop-down menu, and then select Flip on Long Edge for a book or Flip on Short Edge for a tablet .

Click the Printing Shortcut tab, and then select the Two-sided (Duplex) Printing shortcut. Click the Print on Both Sides Manually drop-down menu, and then select Flip on Long Edge for a book or Flip on Short Edge for a tablet .

4. Click OK, and then click Print.

5. If the printer does not automatically print the other side, remove any remaining paper from the input tray to prevent issues.

6. Remove the printed pages from the output tray, and then reload them into the input tray.

For bottom-loading input trays, load the pages print-side up with the top edge towards the printer (book) or bottom edge towards the printer (tablet).

For top-loading input trays, load the pages print-side down with the top edge towards the printer (book) or bottom edge towards the printer (tablet).

7. Click Continue to complete the two-sided print job.

Print on both sides of the paper (macOS)

1. Open the document, and then click File > Print.

2. Select your printer, and then click Show Details if the button displays.

3. From the print settings, look for a Double-sided or Two-sided print option. If the neither option is available, continue with these steps to print manually on both sides of the paper.

Click Double-sided, and then select On for a book (long-edge binding) or On (Short Edge) for a tablet . Click Print. You are done.

Select Two-sided, and then open Layout from the print options menu. Select Long-Edge binding for a book or Short-Edge binding for a tablet . Click Print. You are done.

4. If the Two-sided or Double-sided options are not available, select Paper Handling from the print options menu.

5. Select Odd Only from the Sheets to Print or Pages to Print drop-down menu.

6. From the Sheet Order or Page Order drop-down menu, select Reverse (for bottom-loading input trays) or Automatic (for top-loading input trays), and then click Print.

7. After the pages are done printing, remove any remaining paper from the input tray to prevent issues.

8. Remove the printed pages from the output tray, and then reload them into the input tray.

For bottom-loading input trays, load the pages print-side up with the top edge towards the printer (book) or bottom edge towards the printer (tablet).

For top-loading input trays, load the pages print-side down with the top edge towards the printer (book) or bottom edge towards the printer (tablet).

9. From the software, change the page settings for the second side.

From the Sheets to Print or Pages to Print drop-down menu, select Even only.

From the Sheet Order or Page Order drop-down menu, choose Normal (for bottom-loading input trays) or Automatic (for top-loading input trays).

10. Click Print to complete the two-sided print job.

To change back to one-sided printing, reopen the print settings and remove the selections for two-sided printing.

Once printed you can laminate the A4 pages and then use a guillotine or scissors to cut out each card. A hole punch can be used to create a hole at the top to connect them on a key ring. We hope you find these Spatial Reasoning Toolkit Keyrings helpful in your practice.

To provide feedback on the materials in the Toolkit please scan the QR code or visit www.earlymaths.org/spatial-reasoning

For more ideas and information please scan the QR code below to visit the Spatial Reasoning Toolkit

Adults could:

Ask children to visualise a route in their mind, including decision points.

Create journeys in small world play, ask what can a character see? What will they see next?

Spatial Language:

'route', 'left/right' and 'opposite'

6- and 7-year-olds

Adults could:

Create a school map and discuss distances and relationships between landmarks from different viewpoints.

Use aerial photographs, identify familiar locations, e.g. the school their home.

Spatial Language:

'nearby', 'further away' and 'distance'

6- and 7-year-olds

Adults could:

Encourage children to:

- play ball games and experiment with vehicles and ramps
- direct the movement of programmable toys or each other
- create maps to follow routes with landmarks.

Spatial Language:

'over there', 'further/nearer', 'close to', 'along', 'around', 'between', 'left/right'

6- and 7-year-olds