

FDP LOOPS

| | | |
|----------------|-----|----------------|
| $\frac{3}{10}$ | 10% | $\frac{1}{10}$ |
| 30% | | $\frac{3}{4}$ |
| $\frac{9}{10}$ | 90% | 75% |

The aim is to make square domino loops, like the one in the picture, from 4 dominoes matching the fractions, decimals and percentages. Start with any domino and find 2 other dominoes to match the ends of the first domino. For example, the [$\frac{3}{10}$ and 10%] domino matches with 30% at one end and $\frac{1}{10}$ at the other end. Then $\frac{9}{10}$ matches with 90% and $\frac{3}{4}$ with 75% to complete the square. This uses 4 of the dominoes below. Can you use all 16 dominoes to make 4 domino loops?

| | | | | | | | |
|---------------|-------------------|----------------|-----|---------------|---------------|----------------|-------------------|
| 0.3 | 20% | $\frac{9}{10}$ | 30% | 0.6 | $\frac{1}{4}$ | 0.8 | $33\frac{1}{3}\%$ |
| 0.8 | 25% | $\frac{1}{2}$ | 40% | $\frac{1}{3}$ | 50% | $\frac{1}{10}$ | $\frac{3}{4}$ |
| $\frac{1}{5}$ | $66\frac{2}{3}\%$ | $\frac{1}{4}$ | 0.5 | 75% | 90% | $\frac{3}{5}$ | 80% |
| 0.4 | $\frac{4}{5}$ | $\frac{3}{10}$ | 10% | 50% | 0.6 | 0.25 | 30% |

Solution

| | | |
|------|---------------|-------------------|
| 0.3 | 20% | $\frac{1}{5}$ |
| 30% | | $66\frac{2}{3}\%$ |
| 0.25 | $\frac{1}{4}$ | 0.6 |

| | | |
|----------------|-----|----------------|
| $\frac{3}{10}$ | 10% | $\frac{1}{10}$ |
| 30% | | $\frac{3}{4}$ |
| $\frac{9}{10}$ | 90% | 75% |

| | | |
|---------------|-----|---------------|
| 0.8 | 25% | $\frac{1}{4}$ |
| 80% | | 0.5 |
| $\frac{3}{5}$ | 0.6 | 50% |

| | | |
|---------------|-------------------|---------------|
| $\frac{1}{2}$ | 40% | 0.4 |
| 50% | | $\frac{4}{5}$ |
| $\frac{1}{3}$ | $33\frac{1}{3}\%$ | 0.8 |

This problem is adapted from the NRICH task [Doughnut Percents](#) with permission of the University of Cambridge. All rights reserved.

FDP Loops

Notes for teachers

Why do this activity?

Knowing that fractions, decimals and percentages are 3 different ways of writing and thinking about the same number is fundamental to understanding number. Everyone needs to be able to switch fluently from one representation to another. This game gives practice in recognising the correspondences between one representation and another.

Learning objectives

- Practice in converting between the fraction, decimal and percentage forms of a number.
- To experience a situation where they must consider the requirements of other members of the team and work cooperatively as a group to complete a task.

Possible approach

Each group will need a set of 16 domino cards (see pages 4 and 5)

1. As a regular class lesson

Learners can make their own sets of cards from scrap cardboard. Or you might be able to photocopy the cards below and cut them out.

Although the task can be done entirely with pen and paper, handling the cards and being able to move them around makes the task easier. The learners can do this activity in pairs or groups of three or four. You can allow them to discuss which pieces go together and review the solutions as a whole class.

2. As a lesson to Develop Team Working Skills

For more information about team building exercises see the NRIC article [Developing Good Teamworking Skills](#) and the NRIC task [Doughnut Percents](#).

Alternatively, if space and the size of your class allows, you can use this as a teambuilding exercise as described below.

| | | |
|----------------|-----|----------------|
| $\frac{3}{10}$ | 10% | $\frac{1}{10}$ |
| 30% | | $\frac{3}{4}$ |
| $\frac{9}{10}$ | 90% | 75% |

Draw this domino loop on the board and explain that the class will play a game in groups of 4 and the aim is to build their skills of working cooperatively in teams.

a. **Explain what the teams should try to do.** Tell the class that, without any talking or non-verbal signals, the teams must work together to make 4 square domino loops, like the one in the picture, each loop being made from 4 dominoes. They must match the fractions, decimals and percentages.

To show the class what is involved, start with any domino and ask the learners to find 2 other dominoes to match the ends of the first domino. For example, if you start with the [$\frac{3}{10}$ and 10%] domino then learners need to find the 30% to match one end and at the $\frac{1}{10}$ to match the other end. Then ask for a domino to match $\frac{9}{10}$. They should find that the [90% and 75%] domino completes the square. This uses 4 dominoes.

b. Explain how the teams should work cooperatively.

- The players give dominoes to other team members to help them to end up with a set of four dominoes which join together to form a domino loop,
- Tell the class that the game is played **IN SILENCE** and only the teacher is allowed to speak.

- Split the class into teams of 4.
- Give a set of 16 dominoes to each group distributing the dominoes randomly amongst the 4 team members so that each person has 4 dominoes.

Rules :

- Each member of the team starts with four dominoes in front of them.
- Players pass dominoes to other team members in order to help one another complete their doughnut.
- They must **not talk** to other members of the team or give non-verbal signals (such as pointing at a domino they want)
- The dominoes in front of each person should be visible to everyone.
- Team members can only **give** dominoes; they **cannot take** dominoes from someone else.
- Each team member must have at least two dominoes in front of them at all times.

The observer should check that the team obeys the rules and keep a record of when members of the team help someone else (rather than, for example, when they just pass a piece on without looking at what the other person actually needs).

Key Questions

How many tenths is that?

Can you see another domino that shows the same number of tenths?

Possible Extension

The dominoes can also be arranged into a pair of loops or one loop

. Ask the learners to create these shapes.

Other team-working tasks can be found by going to this article: <http://nrich.maths.org/6933>

Possible support

Learners might find it easier to match the dominoes in a line, and then to break the line into four to make four loops, or break it into two to make two doughnuts, or join the line into one circle.

0.3

20%

$\frac{9}{10}$

30%

0.8

25%

$\frac{1}{2}$

40%

$\frac{1}{5}$

$66\frac{2}{3}\%$

$\frac{1}{4}$

0.5

0.4

$\frac{4}{5}$

$\frac{3}{10}$

10%

$0.\dot{6}$

$\frac{1}{4}$

0.8

$33\frac{1}{3}\%$

$\frac{1}{3}$

50%

$\frac{1}{10}$

$\frac{3}{4}$

75%

90%

$\frac{3}{5}$

80%

50%

0.6

0.25

30%