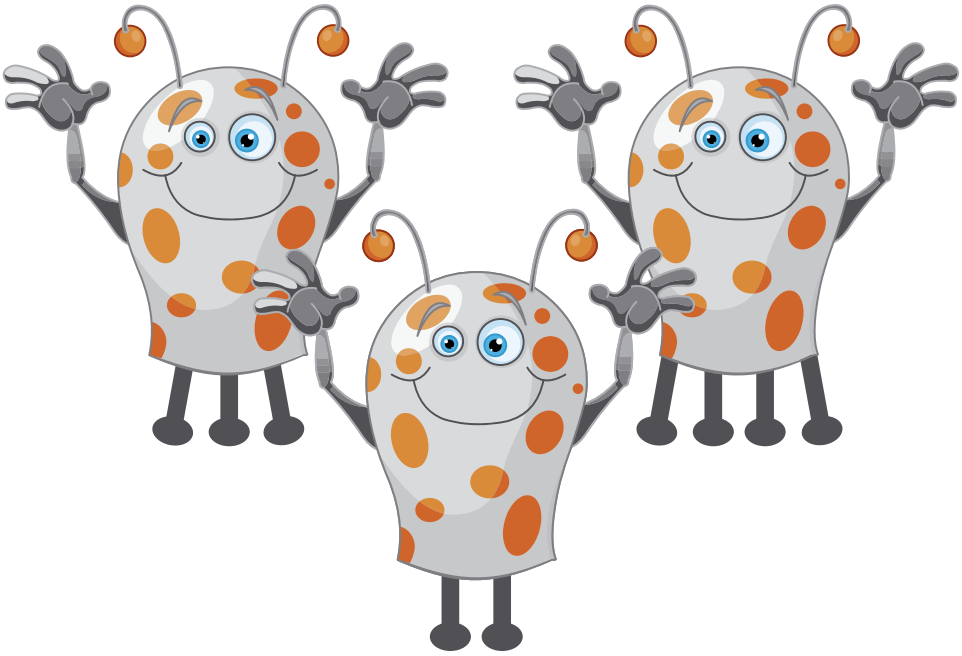
Reasoning in the classroom

Aliens' legs

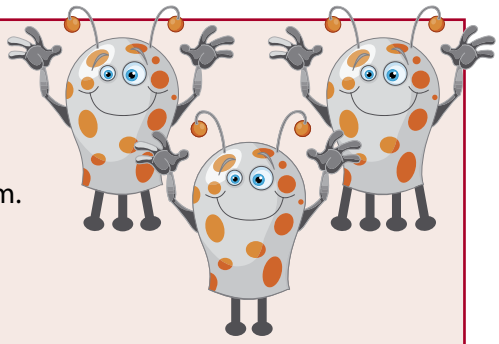


Support materials for teachers

Year 3

Llywodraeth Cymru
Welsh Government

Year 3 Reasoning in the classroom – Aliens' legs



These Year 3 activities require learners to solve a problem and undertake a practical investigation.

Activity 1

Aliens' legs

Learners bring together information to solve a problem.

Includes:

- Aliens' legs question
- Markscheme

Activity 2

How many feet?

They investigate a possible relationship between the length of their feet and their height.

Includes:

- Explain and question – instructions for teachers
- Whiteboard – Number of feet tall, estimate
- Whiteboard – Number of feet tall, measure

Reasoning skills required

Identify	Communicate	Review
Learners choose their own methods.	They work collaboratively, making decisions together.	They review their findings and present their work.

Procedural skills

- **Fractions (half, quarter, three-quarters)**
- **Measuring (non-standard)**
- **Estimating**
- **Bar charts/bar line graphs/pictograms**

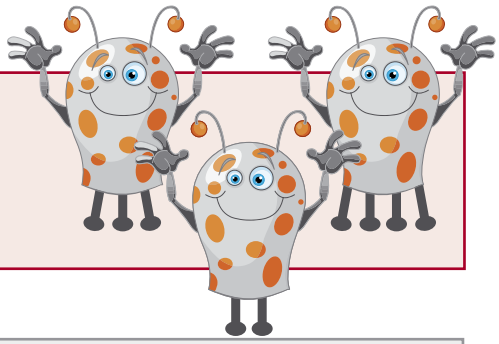
Numerical language

- **Altogether**
- **Half, quarter, three-quarters**
- **Height**
- **Length**
- **Estimate**
- **Whole number**

Activity 1

Aliens' legs

Activity 1 – Aliens' legs



Outline

This Year 3 activity requires learners to apply their numeracy skills to work out the number of legs different aliens have.

You will need

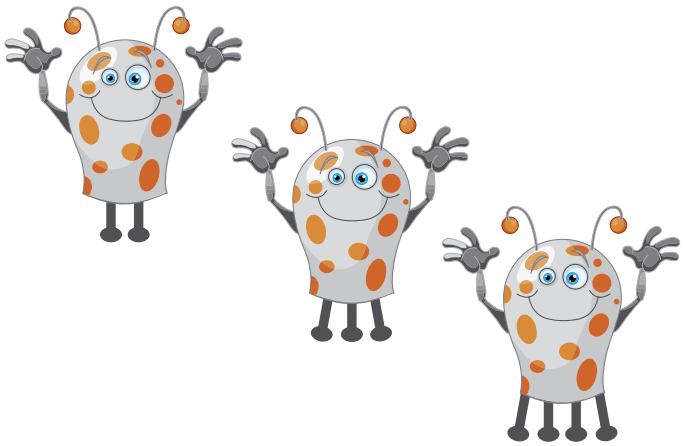
Aliens' legs question
One page for each learner

Markscheme

Some aliens have **2** legs.

Some have **3** legs.

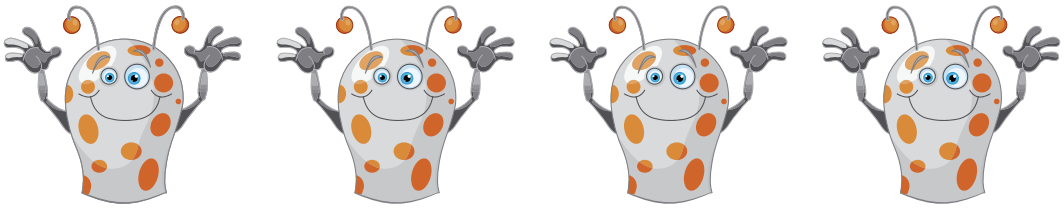
Some have **4** legs.



Four aliens go to the park.

- $\frac{1}{2}$ of them have **3** legs.
- Altogether they have **12** legs.

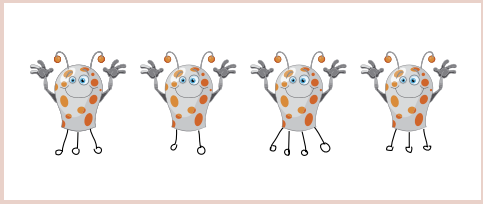
Draw their legs.



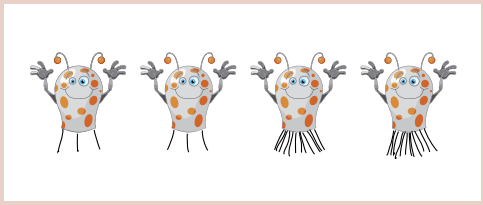
2m

Activity 1 – Aliens' legs – Markscheme and exemplars

Marks	Answer
2m	Shows aliens with 3, 3, 2 and 4 legs, in any order
Or 1m	Shows exactly two aliens with 3 legs Or Shows exactly one alien with 2 legs and one alien with 4 legs

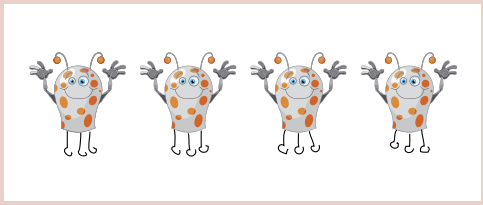


Correct; **2 marks**



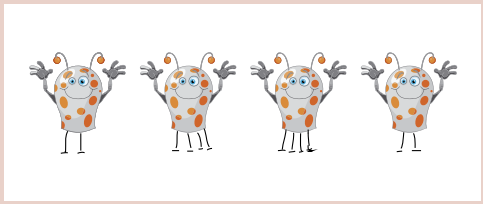
Two aliens with 3 legs; **1 mark**

- As the other two aliens each have 12 legs, it may be that this learner does not understand the meaning of 'altogether'.



Four aliens with 3 legs; **0 marks**

Common error This learner may have started correctly, but has not then realised that the other two aliens cannot also have 3 legs.



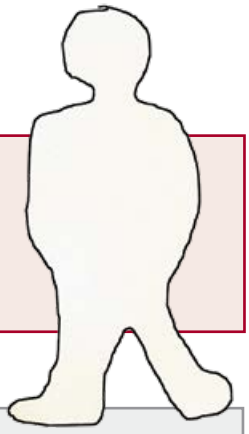
Incorrect; **0 marks**

- It would be interesting to talk with this learner. It may be that they used both sets of information to draw 2 and 4 legs, but then forgot that the other two aliens had 3 legs each.

Activity 2

How many feet?

Activity 2 – How many feet?



Outline

Activity 2 – How many feet? is a practical activity in which learners investigate the relationship between the length of their feet and their height.

You will need

A ruler that can be used to show one foot (12 inches)

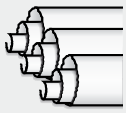
Whiteboard – Number of feet tall, estimate

Whiteboard – Number of feet tall, measure

To capture the size and shape of learners' feet:

Paint in paint trays and strong paper
(or paper to draw around their feet)

To capture learners' silhouettes:



Paper, such as wallpaper lining or sugar-soap paper
(or chalk to show heights against a wall)

Pens and scissors

Activity 2 – How many feet?

Explain

Ask learners if they have heard of the measurement 'one foot'. Use a ruler to show them a foot and ask if they can guess where the name may have come from. Explain its origins *(people measured against their feet)* and tell them they are going to use their own feet as a measure.

Each learner makes an impression of one of their feet onto paper *(painting needs lots of controlling, but is fun!)*. They cut out and write their name on their foot image *(laminating would improve durability)*. Ask them to look at their feet measurers – could we use them in the real world, e.g. to buy carpet? Discuss why standard measurements came into being.

Show **Number of feet tall, estimate** on the whiteboard. Ask learners to decide in their groups what they think the missing number is. Discuss, then show **Number of feet tall, measure**. Who was right? Now ask if they think this number will be exactly the same for everyone.

In their groups, they work together to capture each person's body outline and *(preferably)* cut it out. Then each learner uses their own foot measurer to work out the number of feet in their height – encourage them to make their own decisions about what to do when this is not a whole number.

Bring the groups together to discuss and pool their results. Finally, ask each group to produce a report comparing their results with the overall class data. This should include a bar chart, bar line graph or pictogram, as well as notes of any differences between the group and class results.

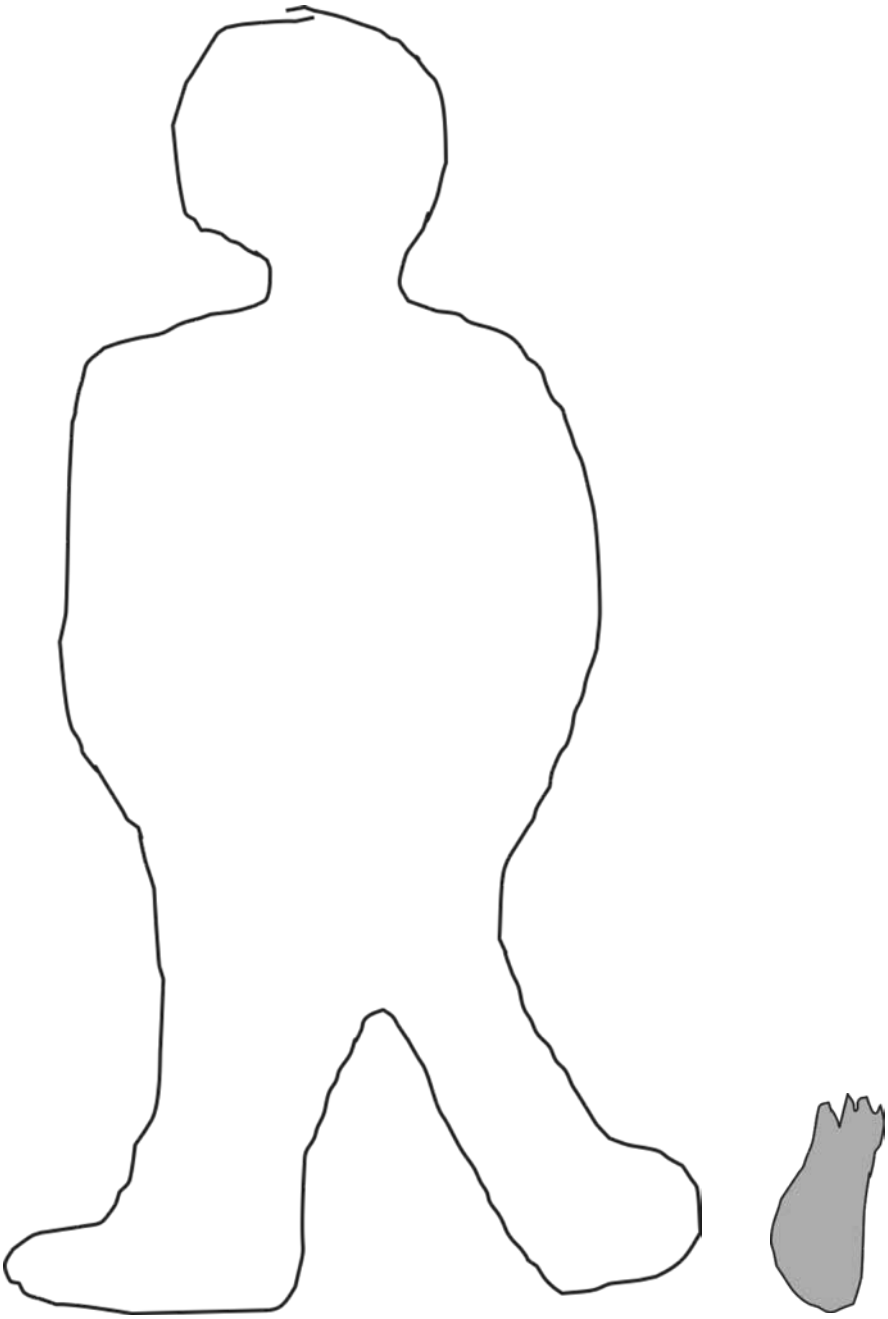
Before ending the activity, make sure to ask learners to compare their foot measurer with a foot length on a ruler *(to avoid the risk of them becoming convinced that an imperial 'foot' is the same length as the one on the end of their leg!)*.

Question

- Where on your feet are you going to measure? Why is that important? *(You cannot draw together information across the class unless you all use the same points on your feet to measure.)*
- What does estimate mean? What is your estimate of the number of feet in your height? What will you do if, when you measure, it is not a whole number? How can you decide if you need a half, or a quarter, or three-quarters, of one of your feet? *(Folding is one option.)*
- Is there much difference between the results of the group? Why do you think that is?
- What are the important things to include in your report? Why? Why does drawing a chart help to show the results for the class?
- Why is measuring using someone's foot not used today?

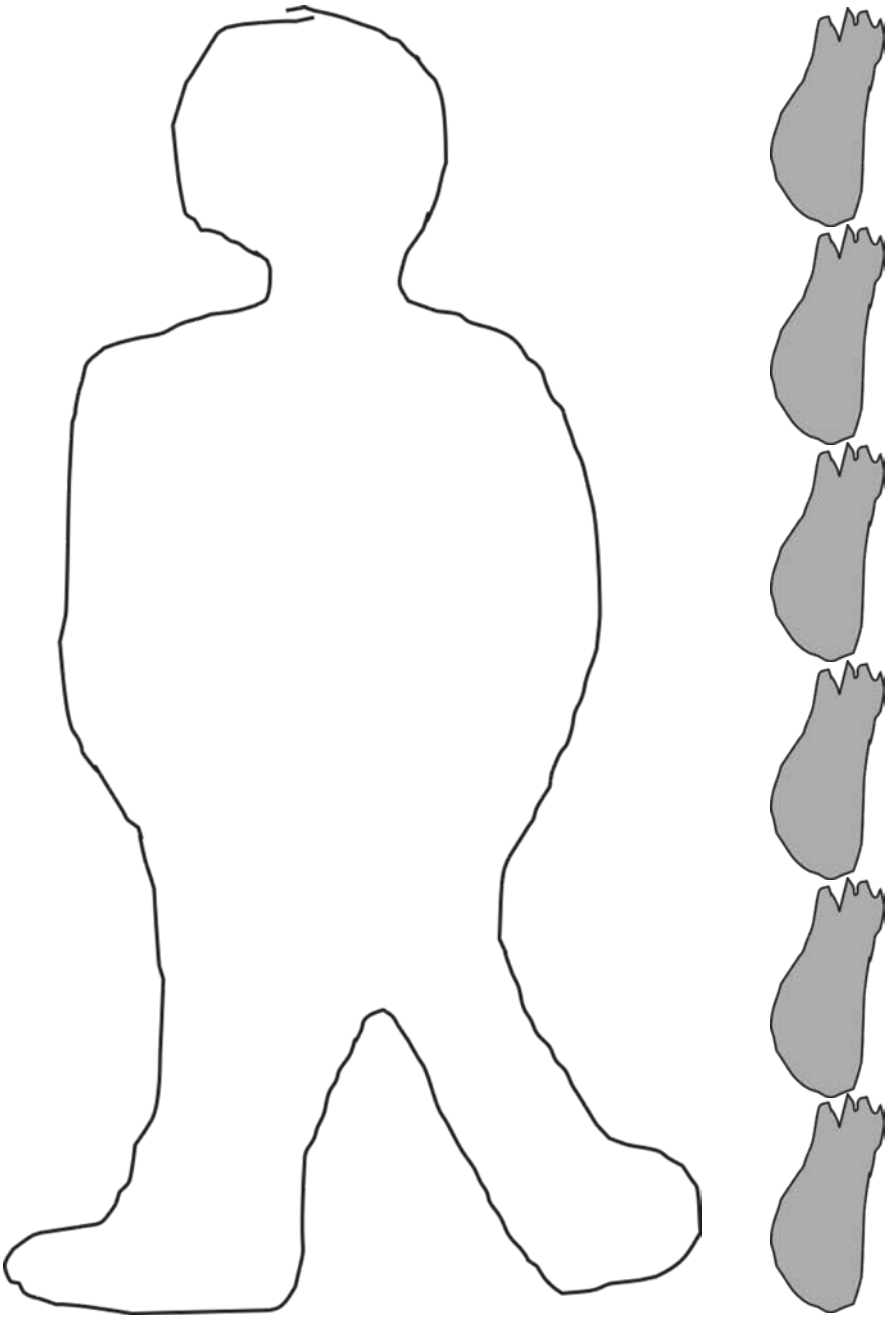
Extension

- Learners use their foot measurer to measure other objects, or to compare the length of their arms to their feet, and so on.



His height is

☐ times the length of his foot.



His height is

6 times the length of his foot.