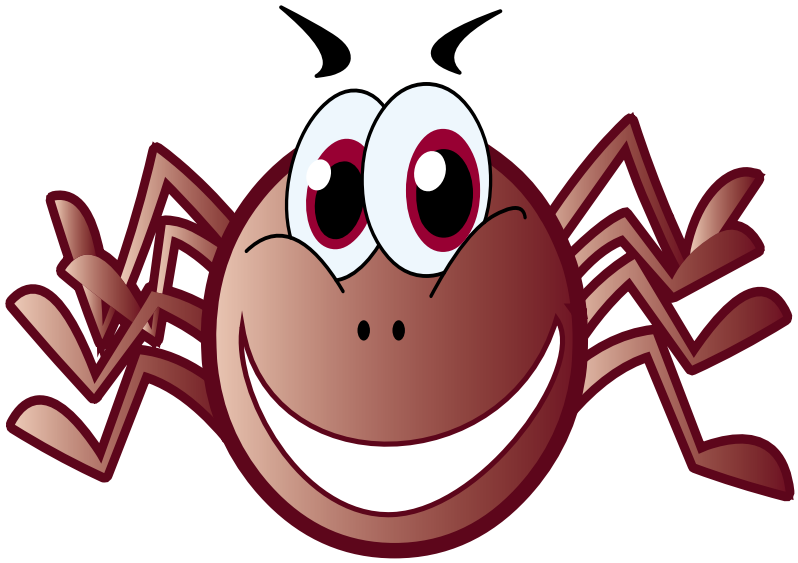
Reasoning in the classroom

Incy Wincy Spider



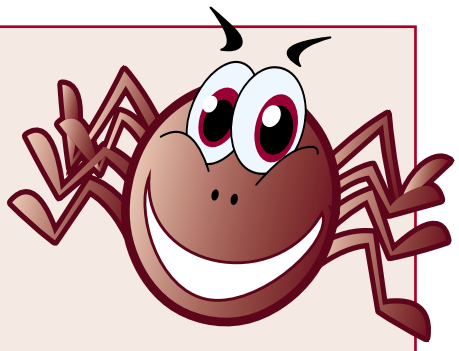
Support materials for teachers

Year 4

Llywodraeth Cymru
Welsh Government

Year 4 Reasoning in the classroom – Incy Wincy Spider

These Year 4 activities encourage learners to use fractions within a wide range of contexts.



Activity 1

Incy Wincy Spider

Learners use simple fractions to solve a problem.

Includes:

- Incy Wincy Spider question
- Markscheme

Activity 2

Spider web fractions

They create as many fraction questions as possible that have the same answer.

Includes:

- Explain and question – instructions for teachers
- Whiteboard – Spider web
- Resource sheet – Spider web fractions

Activity 3

The spider's home

They consider diagrams and produce explanations as to why each represents the fraction $\frac{1}{2}$.

Includes:

- Explain and question – instructions for teachers
- Whiteboard – The spider's home (shape 1)
- Whiteboard – The spider's home (shape 2)
- Resource sheet – The spider's home

Reasoning skills required

Identify	Communicate	Review
Learners use their understanding of fractions within a range of different contexts.	They explain their reasoning and create simple proofs.	They 'mark' work from other groups and give feedback.

Procedural skills

- **Fractions, including finding fractional quantities**

Numerical language

- **Altogether**
- **Numerator**
- **Denominator**

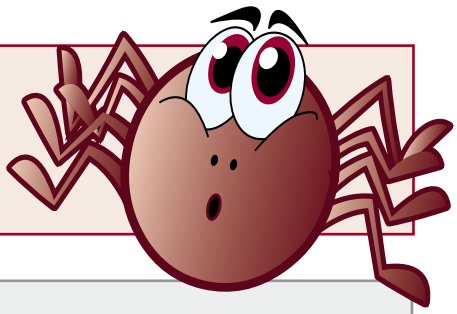
Activity 1

Incy Wincy Spider

Activity 1 – Incy Wincy Spider

Outline

Learners use their knowledge of fractions to solve a simple problem.
They make their own decisions about what to do and what to write down.



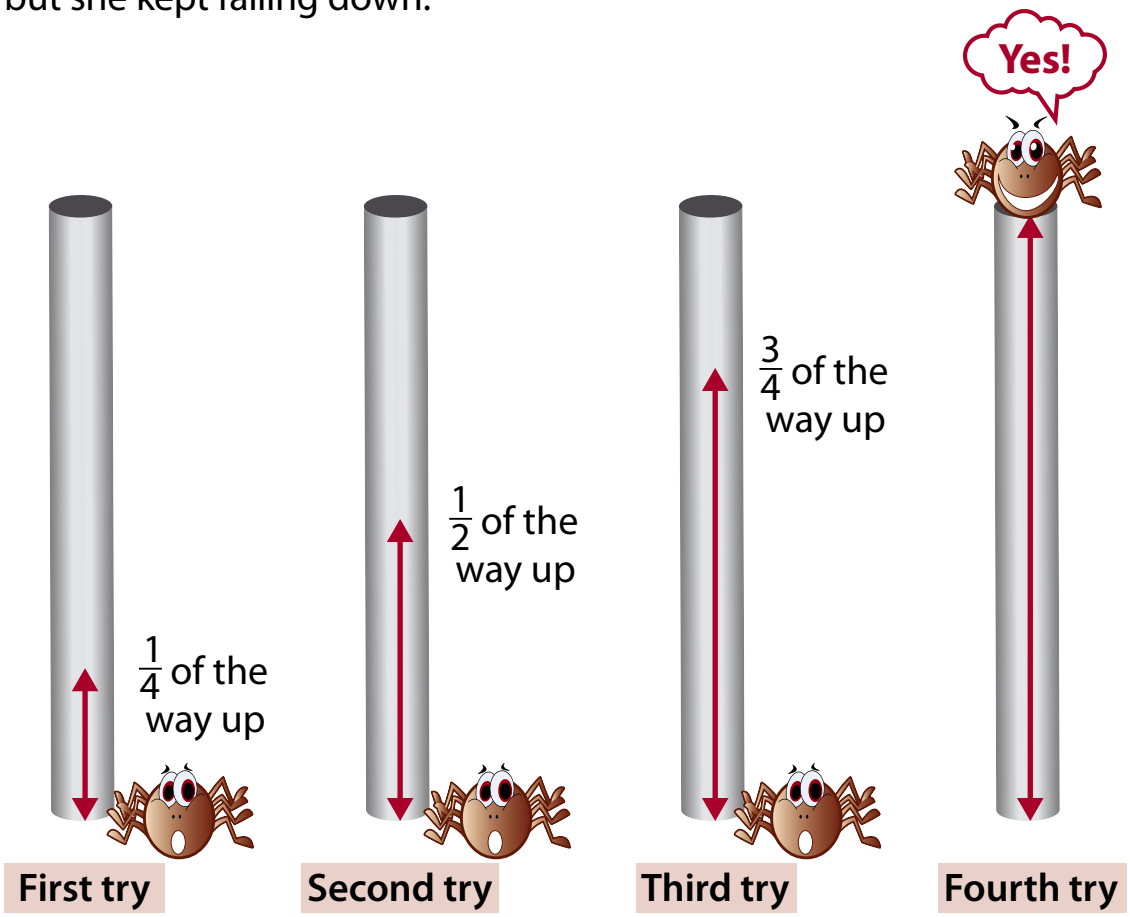
You will need

Incy Wincy Spider question
One page for each learner

Markscheme

Incy Wincy Spider climbed up the water spout …

but she kept falling down.



The spout is **8** metres high.

How many metres did the spider climb **up** altogether?

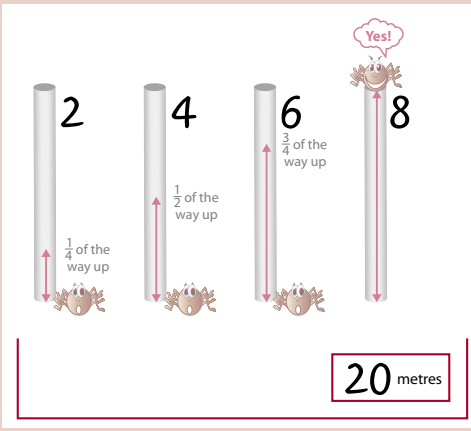
metres

3m

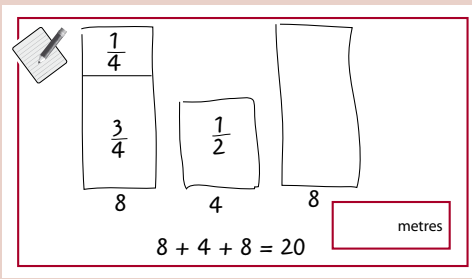
Activity 1 – Incy Wincy Spider – Markscheme

Marks	Answer	
3m	**20** metres	
Or 2m	Gives the answer **32** metres	◀ **Has included the downs**
	Or	
	Gives the answer **12** metres	◀ **Has omitted the final 8m**
	Or	
	Links $\frac{1}{2}$ to **4** and $\frac{1}{4}$ to **2** (or $\frac{3}{4}$ to **6**)	
	Or	
	Shows the value $\mathbf{1\frac{1}{2}}$ or $\mathbf{2\frac{1}{2}}$	◀ **The total height of the first three or four climbs**
Or 1m	Links $\frac{1}{2}$ to **4**	
	Or	
	Links $\frac{1}{4}$ to **2**	
	Or	
	Links $\frac{3}{4}$ to **6**	
	Or	
	Shows or implies that $\frac{1}{4}$ and $\frac{3}{4}$ is **1**	

Activity 1 – Incy Wincy Spider – Exemplars

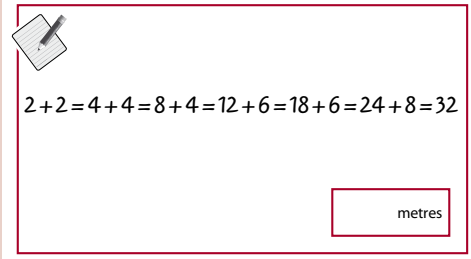


Correct; **3 marks**



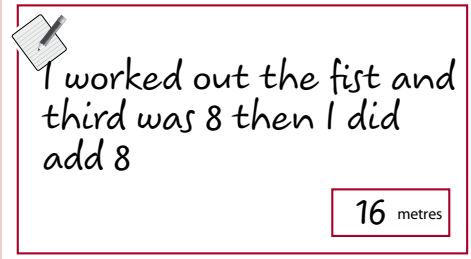
Correct; **3 marks**

- The diagram shows that the $\frac{1}{4}$ and $\frac{3}{4}$ climbs have been combined. This learner shows good understanding of fractions and also communicates well.



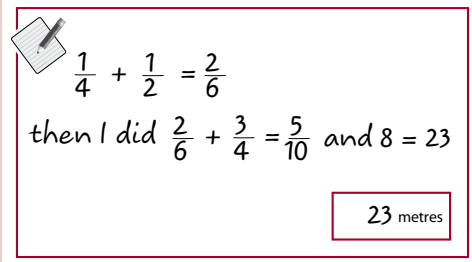
Answer 32; **2 marks**

- This learner shows good understanding of fractions but has included the amount climbed down. They would benefit from discussion as to why repeated use of the = sign is not good numerical communication.



Implies $\frac{1}{4}+\frac{3}{4}=1$; **1 mark**

- 'The first and third was 8' shows understanding that these fractions make a whole. Had 4m, the remaining half, also been added, this learner would have scored 3 marks.



Incorrect; **0 marks**

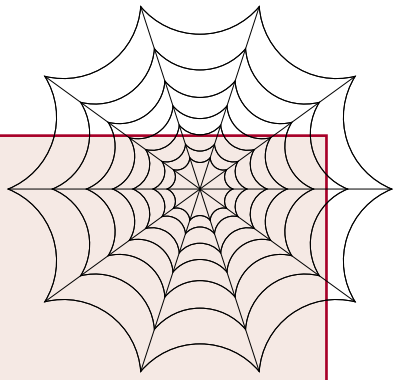
Common error

Throughout a lack of understanding of fractions is shown: this learner has added the numerators and then the denominators without considering the meaning of simple fractions.

Activity 2

Spider web fractions

Activity 2 – Spider web fractions



Outline

This activity is designed to carry on from **Activity 1 – Incy Wincy Spider**.

Learners use their understanding of fractions to create fraction questions that always have the same answer.

Groups then 'mark' each other's work, explaining errors if found.

You will need

Whiteboard – Spider web

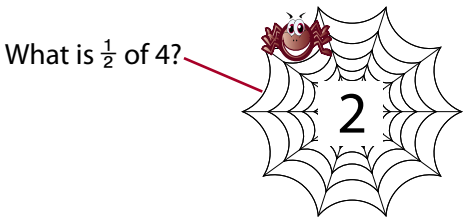
Resource sheet – Spider web fractions
One page for each learner

Activity 2 – Spider web fractions

Explain

Show **Spider web** on the whiteboard and say that this spider really loves the number 2 – and she also loves fractions.

Write 'What is $\frac{1}{2}$ of 4?' on the board by the spider's web and join it with a line, i.e.



Ask if anyone can find another fraction that has the answer 2? *(For example, what is $\frac{1}{4}$ of 8?)* Add this to the spider diagram then ask for another suggestion. *(For example, what is $\frac{1}{3}$ of 6? . . . or . . . what is $\frac{1}{5}$ of 10?, etc.)*

Give the resource sheet **Spider web fractions** and ask groups to decide what number their spider loves. Once they have written their number, their challenge is to find as many fraction questions as possible for their spider.

Groups then 'mark' each other's work, explaining errors if found.

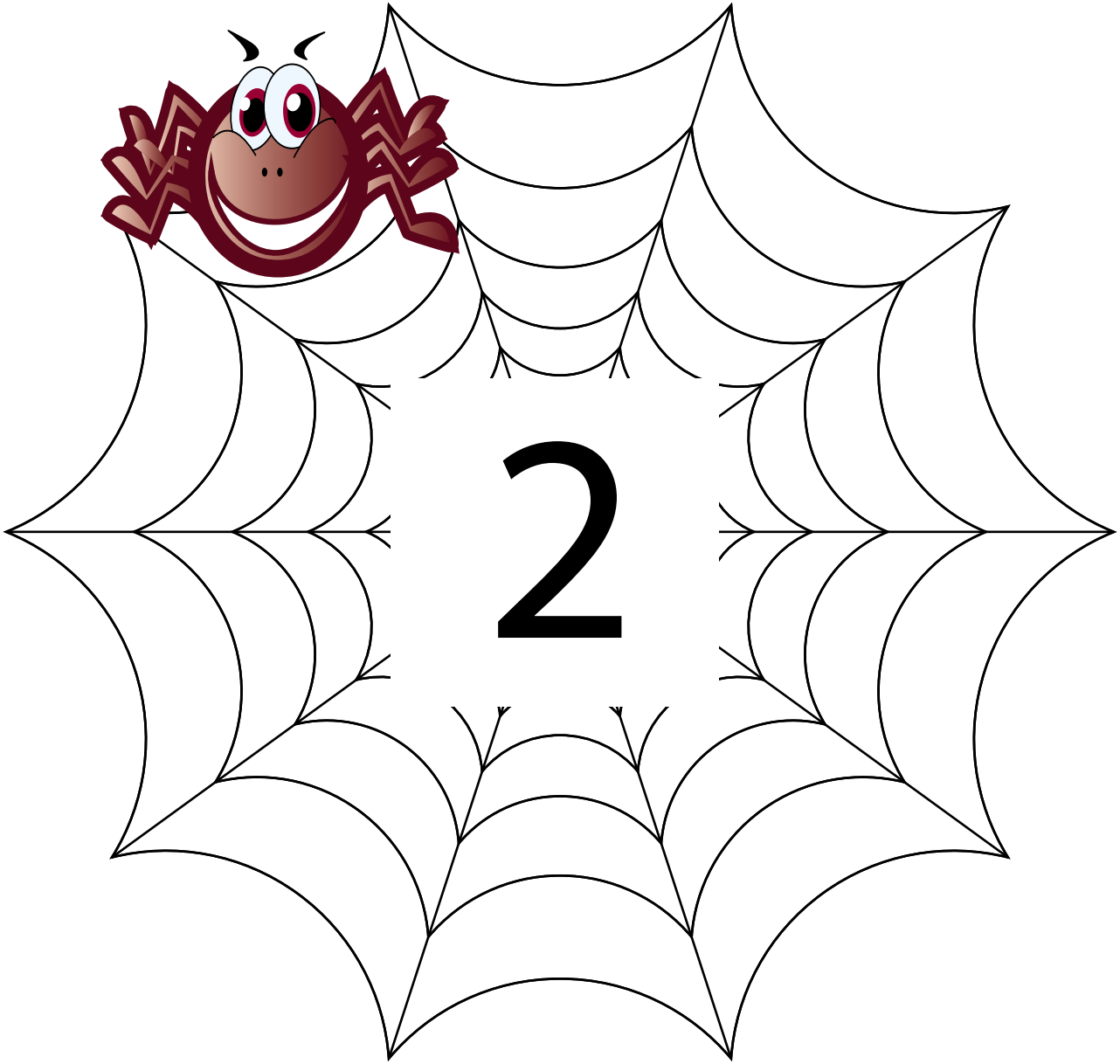
Question

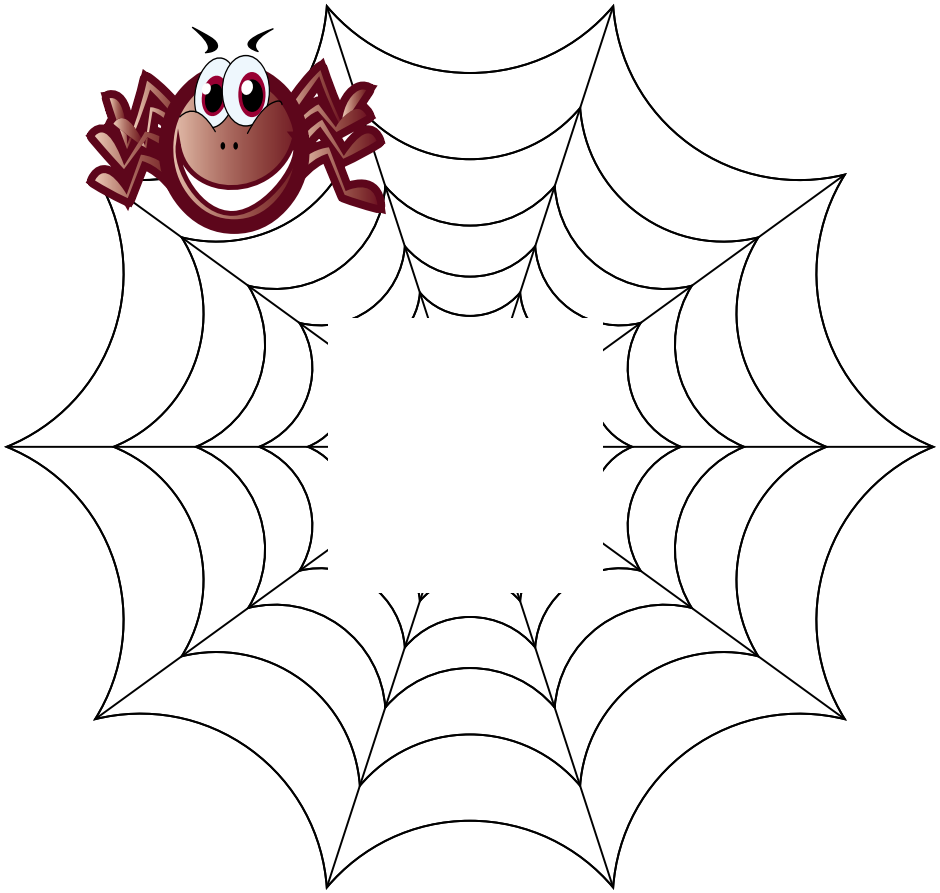
- How are you working out the fraction questions for your spider?
- How are you certain that the answer is always XX?
- Have you got a system? *(For example, increasing the denominator by 1 each time.)*
- How many different fraction questions might there be? *(There is an infinite number.)* How do you know?

Extension

- Can you use fractions that don't have 1 as the numerator?

WB

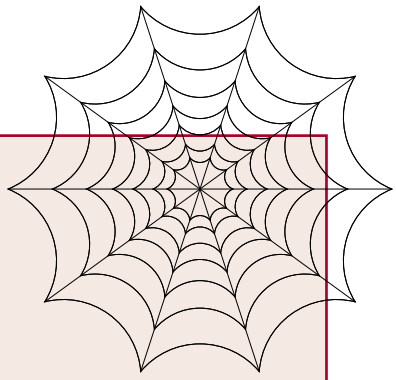




Activity 3

The spider’s home

Activity 3 – The spider's home



Outline

This activity is designed to carry on from **Activity 2 – Spider web fractions** but can also follow **Activity 1 – Incy Wincy Spider**.

Learners consider diagrams and produce explanations as to why each represents the fraction $\frac{1}{2}$.

You will need

Whiteboard – The spider's home (shape 1)

Whiteboard – The spider's home (shape 2)

Resource sheet – The spider's home

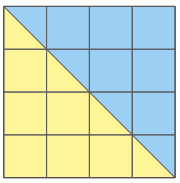
Scissors

Activity 3 – The spider's home

Explain

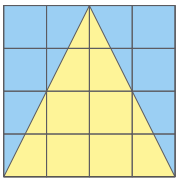
Tell learners that the spider lives in a house that has a square floor. She loves fractions so much that she paints her floor so that exactly half of it is yellow.

Show **The spider's home (shape 1)** on the whiteboard.



Ask learners to explain to you how they know that exactly half of the floor is yellow. *(You may wish to encourage learners to think about folding the shape along the diagonal – this can be done practically to support the learning.)*

Now show **The spider's home (shape 2)** on the whiteboard.



Can they convince you that exactly half of the floor is yellow? *(Cutting and folding, or cutting out the blue pieces and placing them on the top of the yellow, can support the learning.)*

Give learners the resource sheet **The spider's home** and ask them to produce arguments to convince you that for each floor exactly half is yellow.

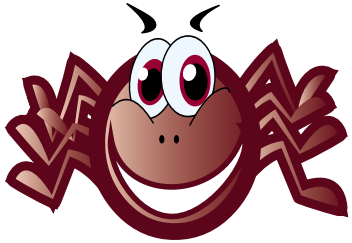
Question

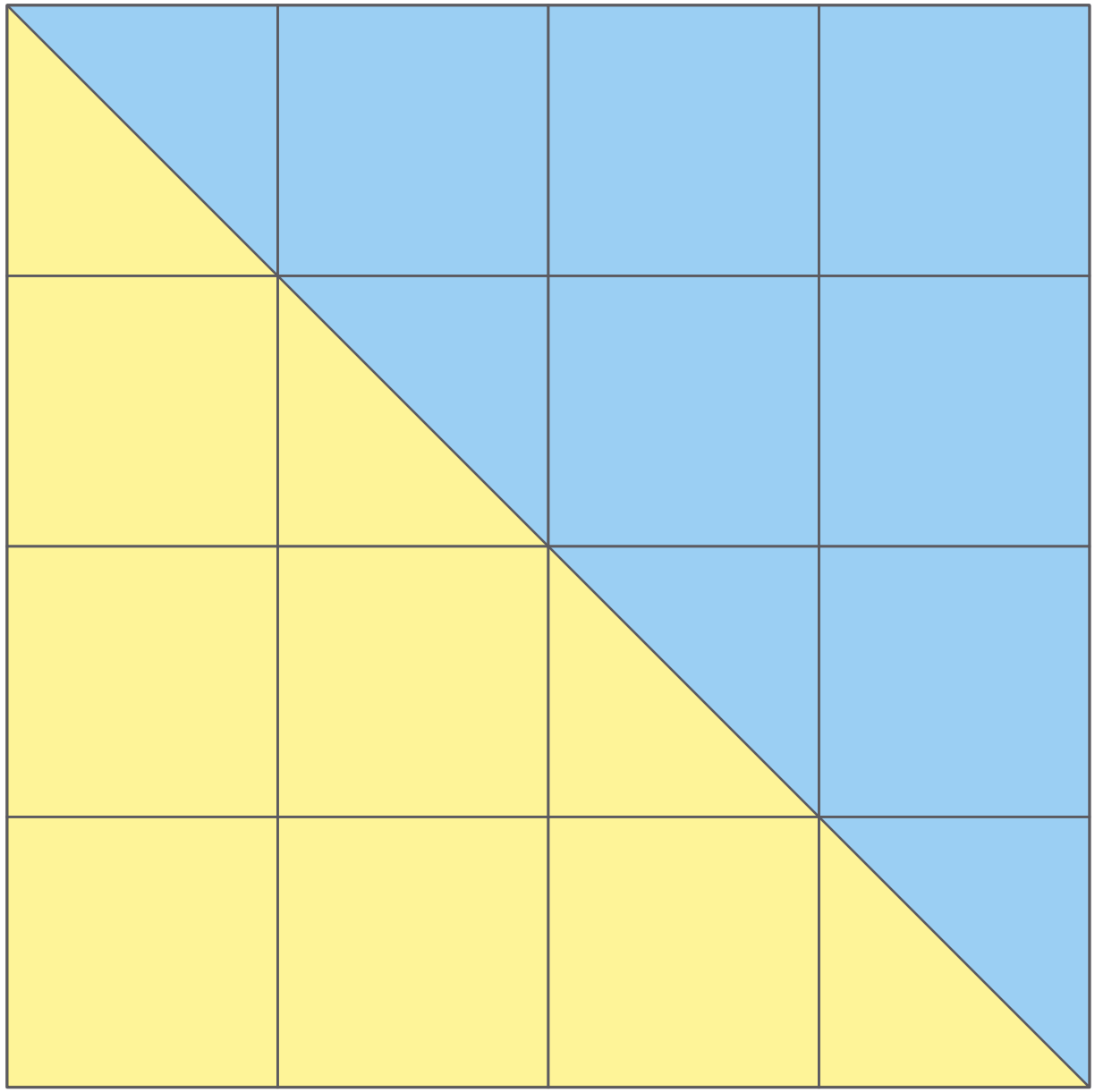
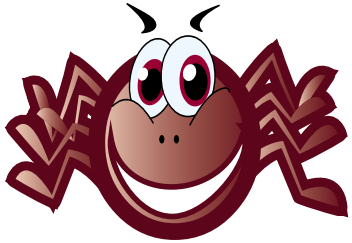
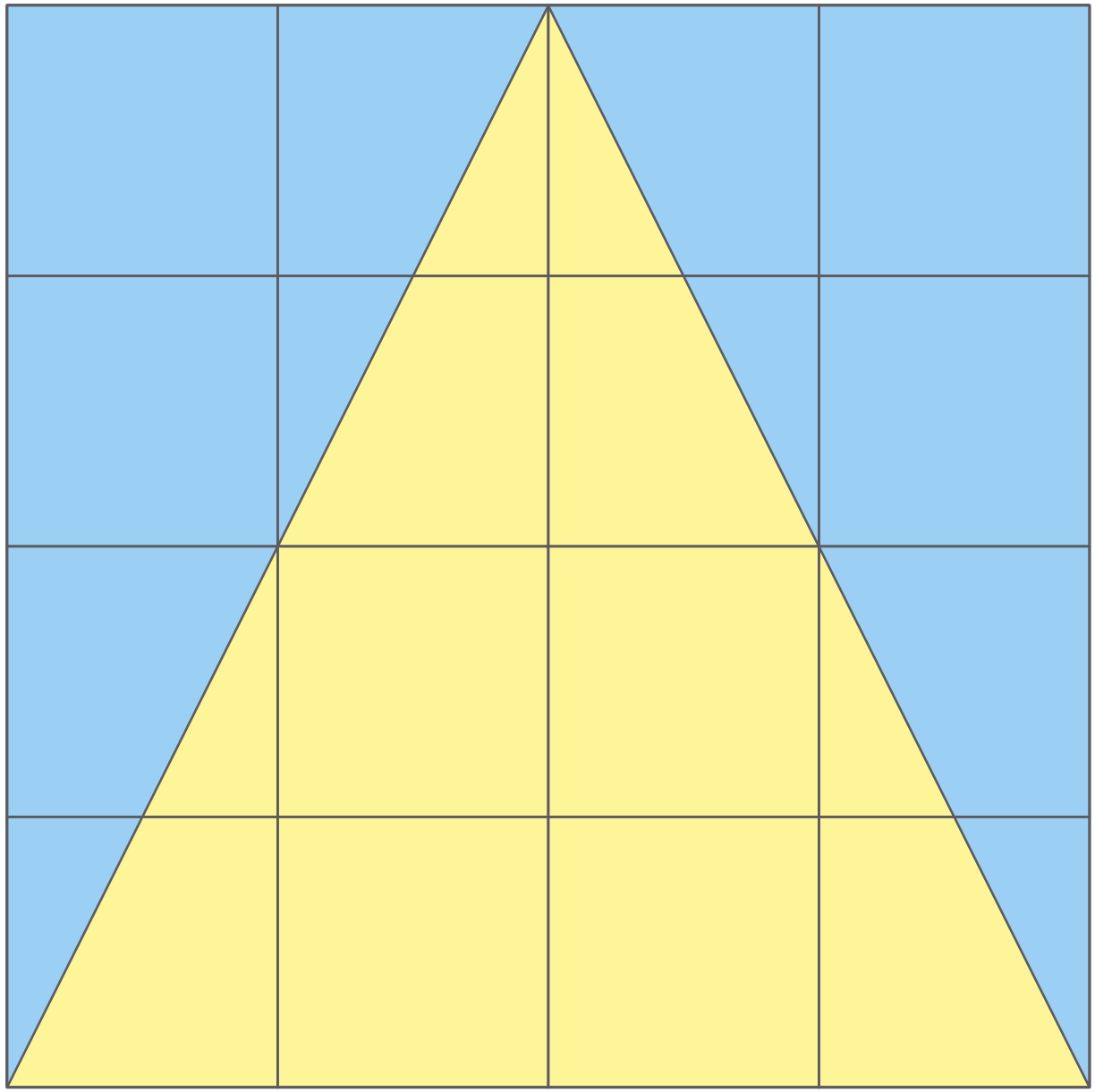
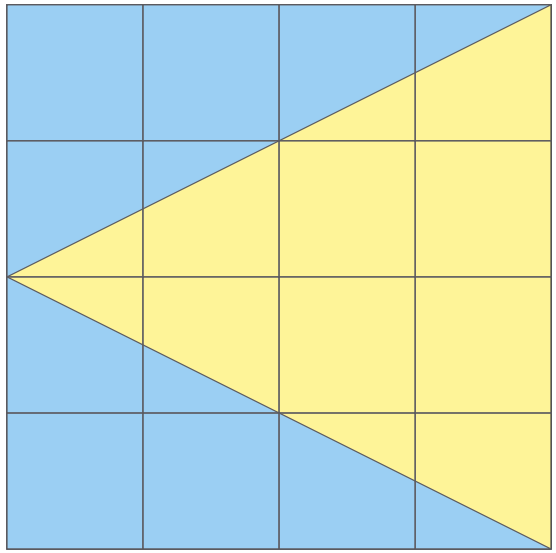
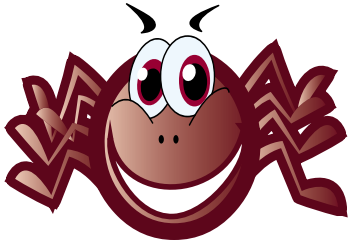
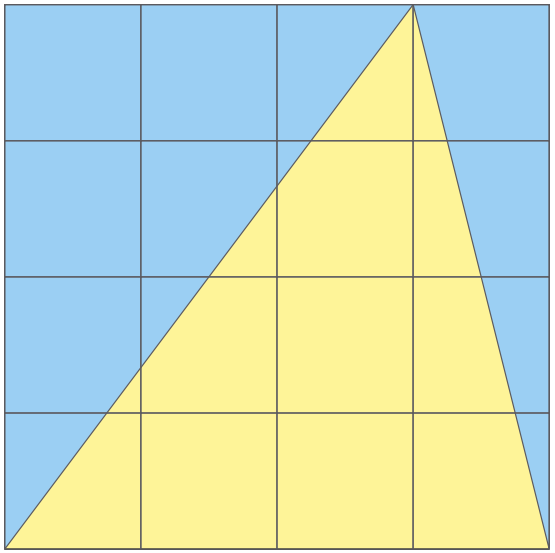
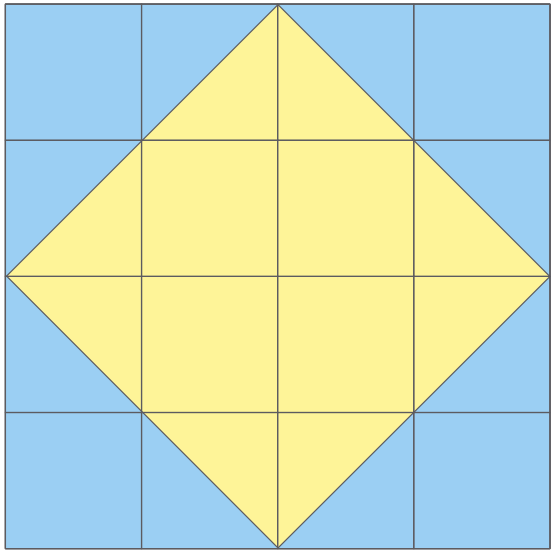
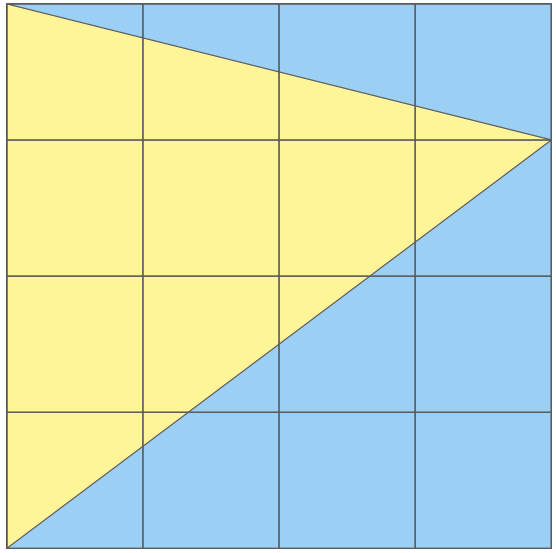
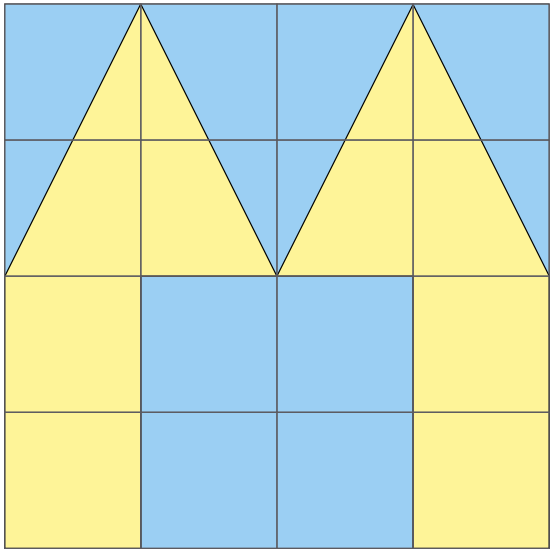
- Which shapes are easy to explain? Why?
- Which shape is the hardest to explain? What makes it harder?
- Suppose the spider made a mistake and exactly half of the shape wasn't yellow. What would you see if you cut out the blue pieces and put them on top of the yellow pieces?
- Can you make some different floors for the spider that are exactly half yellow?

Extension

- Learners make floors for the spider that are, for example, quarter yellow.
- You may also wish to use these diagrams to build on their understanding of area.

WB

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