Quiz

Quiz: Please complete the questions

Quiz

True or false?

1) Pupils will be able to gain a **deep** understanding of a concept if you provide them with a simplified definition.
2) Non-examples are a good way to demonstrate what something is not. Effective non-examples are as different to the example as possible.
3) Providing pupils with more than one example will support them generalise their understanding of a concept to new contexts.

Answers

1) False. Even when simplified, definitions can be just as abstract or unfamiliar as a concept itself, especially where unfamiliar or technical language is used.
2) False. Effective non-examples should be as similar to the examples as possible so they clearly demonstrate the boundary of a concept.
3) True. Two or more examples are better than one because they help build a more developed mental model of a concept.

Using examples and non-examples

Facilitator Name

Seminar norms

Throughout the seminar, please:

- Be present
- Be proactive
- Critique with kindness

Seminar objectives

By the end of this seminar, you will:

- understand how examples and non-examples support pupil understanding;
- be able to apply the principles of effective examples and non-examples;
- have considered how to use examples and non-examples in your practice.

Related ECF statements

Learn that…	Learn how to…
Classroom Practice (Standard 4 – Plan and teach well structured lessons)	
4.3 Modelling helps pupils understand new processes and ideas; good models make abstract ideas concrete and accessible.	Plan effective lessons, by: ***4h*** Using concrete representation of abstract ideas (e.g. making use of analogies, metaphors, examples and non-examples).
Subject and Curriculum (Standard 3 – Demonstrate good subject and curriculum knowledge)	
	3l Interleaving concrete and abstract examples, slowly withdrawing concrete examples and drawing attention to the underlying structure of problems.

The goal of teaching

Prevent working memory overload

Transfer knowledge from working memory to long-term memory

Effective explanations

- **Teach in small steps**
- **Combining graphical and verbal explanations**
- **Remove unnecessary information**
- **Use worked examples**
- **Concrete examples and non-examples**

Why are examples important?

Electrolysis is a chemical decomposition produced by passing an electric current through a liquid or solution containing ions.

- How effective is this definition in supporting learning?
- How could the definition limit pupils' understanding?
- How might this definition make a pupil feel at the beginning of a lesson?

"We understand new things in the context of things we already know, and most of what we know is concrete."

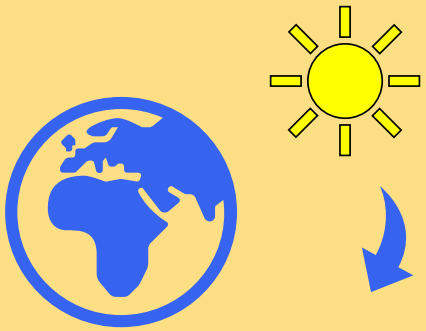
(Willingham 2009, p. 67)

Learning through examples

- More effective teachers give more examples
- Pupils make generalisations based on the examples presented

Inaccurate generalisations

“I hitted the ball!”



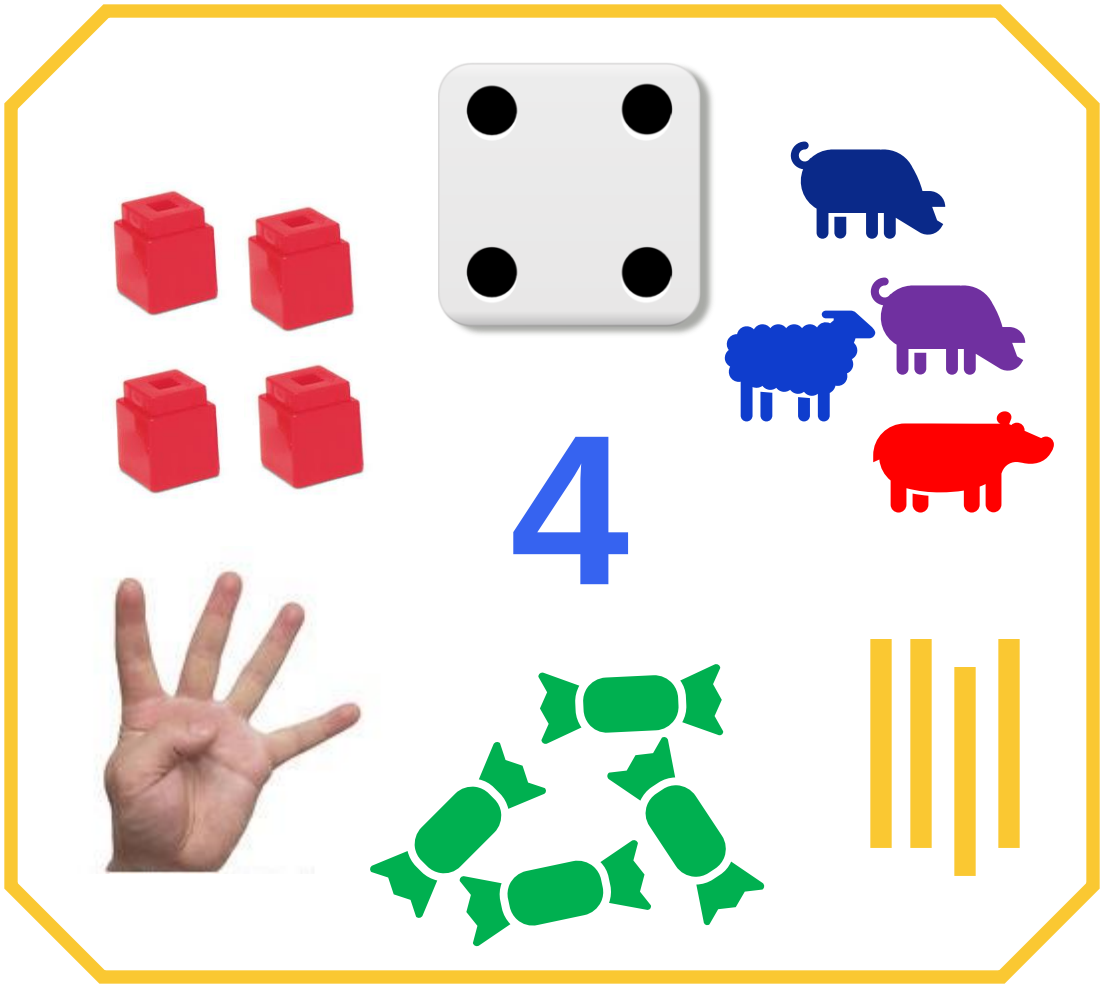
Effective concrete examples

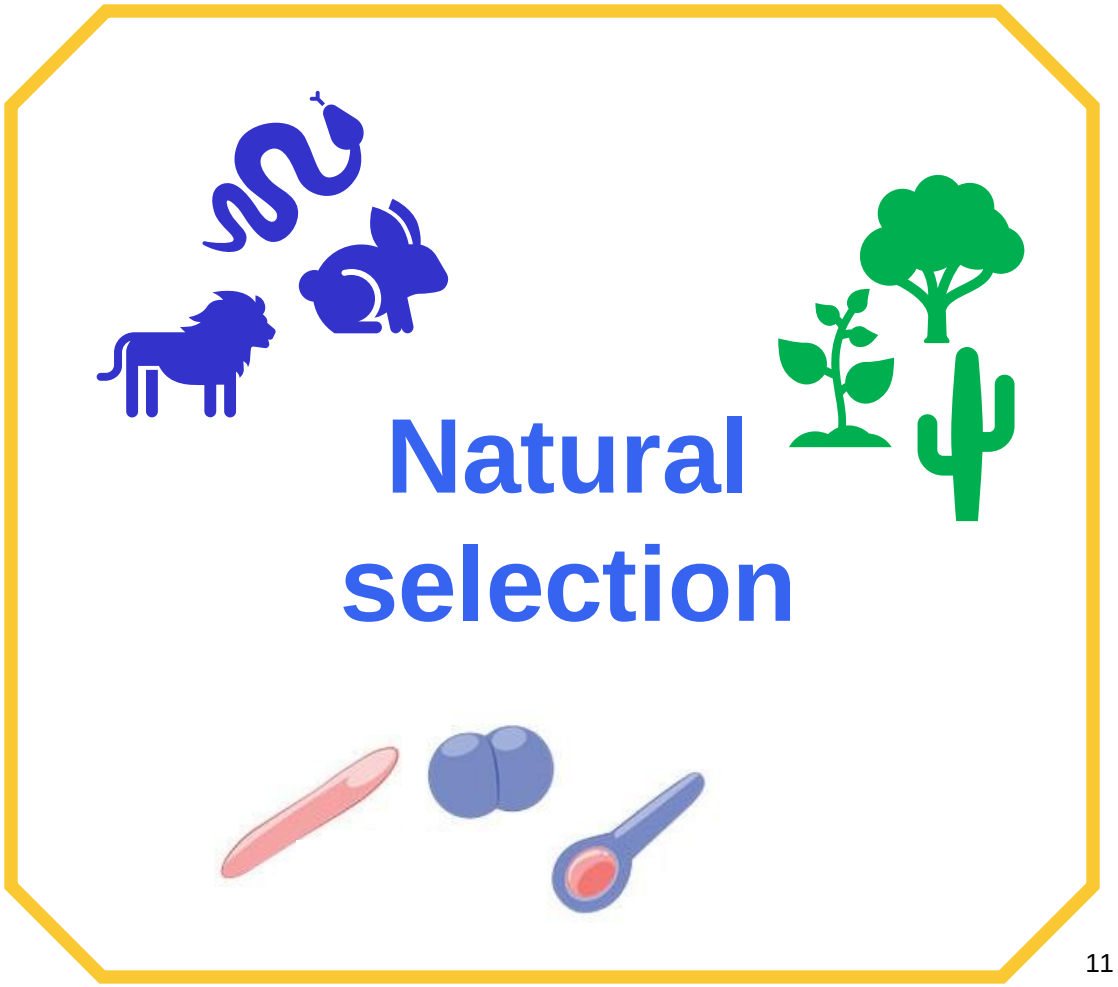
Provide more than one example

Expose subtle variations

Ensure examples are relatable

Provide more than one example





For example...

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{5}$ $\frac{1}{8}$

$\frac{2}{2}$ $\frac{2}{4}$ $\frac{3}{5}$ $\frac{7}{8}$

$\frac{4}{2}$ $\frac{5}{4}$ $\frac{10}{5}$ $\frac{9}{8}$

Reflect:

What misconceptions do pupils commonly develop in the subject/phase you teach?

What may cause this?

Expose subtle variations

Broad range of contexts

The crow's squawk pierced the silence.

Catherine's gloves were soaked.

My laptop's screen had broken.

My new house was my mother's friend's old house.

Subtle variations

The gloves were Alisha's.

They were Alisha's gloves.

We visited Alisha's house.

I am going to Alisha's tonight.

(Adapted from Tharby, 2019)

Ensure examples are relatable

‘Homeostasis is the **maintenance** of a constant **internal environment**’.

“Imagine you are exercising. Your body temperature goes up. How does your body respond? You sweat, cooling your body down. On the other hand, on a cold winter day, as soon as your body temperature goes down, your muscles start shivering which warms you back up. So, when your body temperature goes up, your body does something to bring it back down. When it goes down, your body does something to bring it back up to maintain a healthy level.”

“What happens if your drink too much water? You may need to visit the loo more often – you urinate more. What happens when your body loses too much water, say on a really hot day? Well, you feel thirsty to increase your water levels. So: when your water levels go down, your body does something to make it go up and vice versa to help maintain a healthy level.”

“We call things like ‘body temperature’ and ‘water levels in the body’ our *internal environment* because they are conditions *inside* the body that might change.

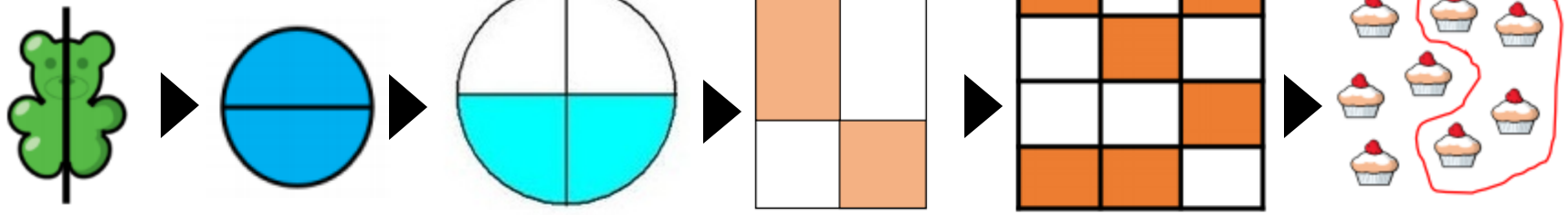
What can you do to ensure examples are relatable?

- Use examples that **all pupils will have experienced** regardless of their life experiences
- Use **familiar language** to help pupils digest and comprehend the examples given
- Ensure the examples illustrate **ambiguous terms** in the definition and **explicitly** highlight this to pupils

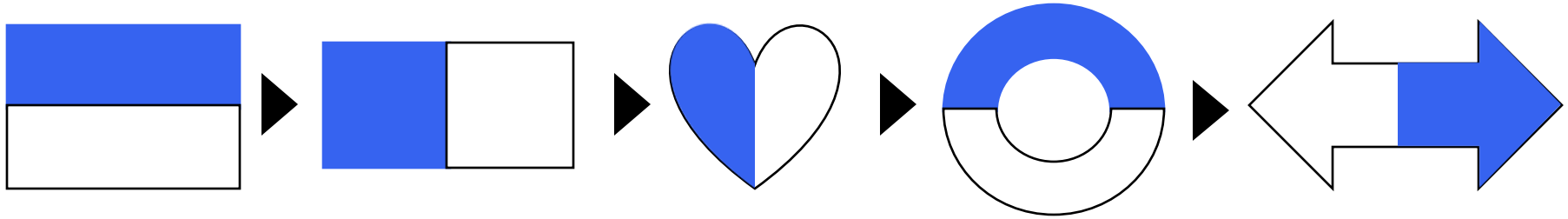
Which is more effective?

Set A

One half



Set B



- Which example set do you think is better and why?
- What assumptions might pupils make from Set A and Set B?

Why non-examples are important

- Qualities can be **overgeneralised.**
- Pupils can learn what a concept is by learning **what it is not**.

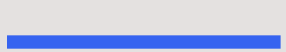
For example

10 > 5

-10 > - 5

Effective non-examples

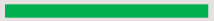
Set A



This line is horizontal

This line is not horizontal

Set B



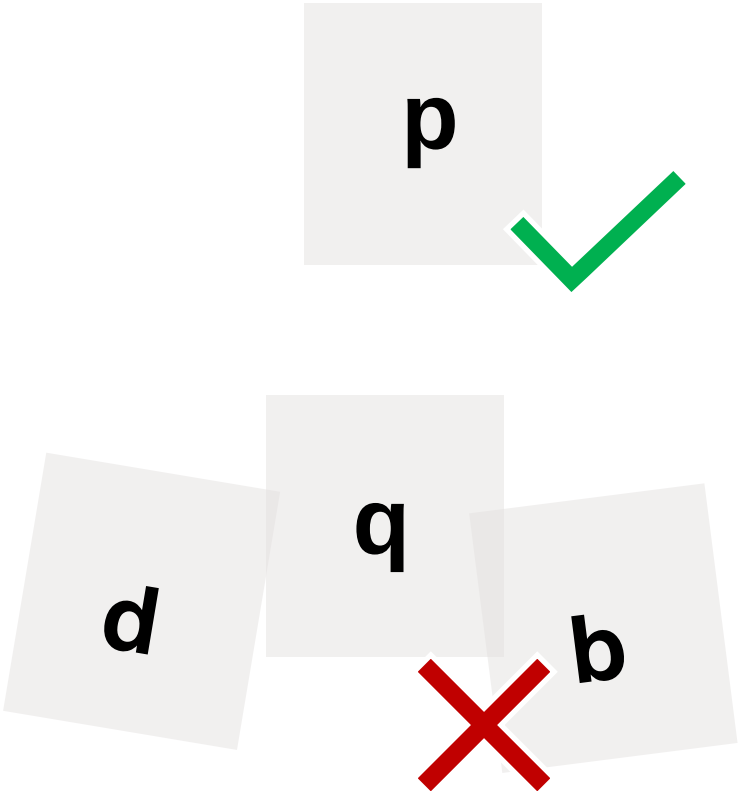
This line is horizontal

This line is not flat

(Adapted from Englemann and Carnine, 1982)

The non-examples you present should only have **one quality** that differs to the example and be as **similar** to the example as possible.

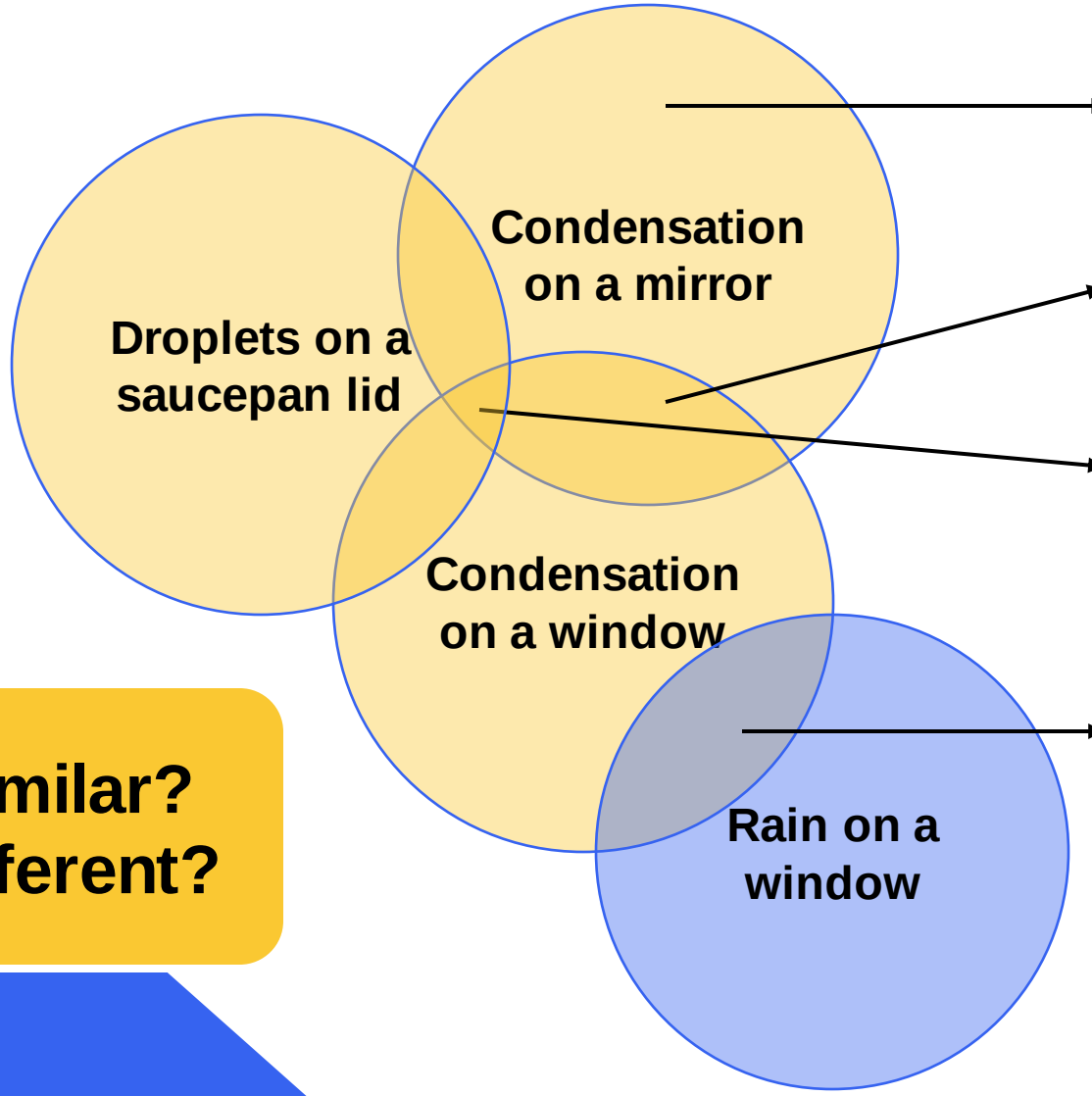
Addressing misconceptions



Gina was happy; it was her birthday

Gina was happy; because it was her birthday.

Using examples and non-examples together



Surface-level differences
which help pupils generalise

Surface-level similarities
which are undesirable

Structural similarities
which illustrate the concept

Non-examples exposes
irrelevant surface-level similarities

How are they similar?
How are they different?

(Adapted from Raichura, 2019)

Ensuring pupils extract the underlying structures

Draw out the **structural similarities** under the **surface-level-differences by:**

- Providing multiple examples with different surface-level details.
- Drawing attention to surface-level similarities which can lead to misconceptions and address these using non-examples.
- Asking pupils to compare different examples and non-examples to extract the underlying structure.

Application to practice

Identify a concept you will soon teach and:

- identify two or more examples to use to illustrate this concept
- if possible, identify a non-example that will help to illustrate the boundary of the concept
- consider how you will support pupils to identify the underlying structure of the problem
- identify how you will assess whether they have understood the underlying structure of a concept.

Reflection

1. Do you use non-examples and examples as effectively as possible?

2. What could you do to further support understanding?

Consider:

- Did pupils struggle to understand definition or premise of the concept?
- Did pupils overgeneralise their understanding?
- Did pupils struggle to transfer their understanding to new contexts?

Next steps

1. Identify three things you will take away from this seminar and implement in your practice.

2. Identify any next steps that you could take to support you in doing this.

Thank you.

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References

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