Settling task

Write down 2–3 subject-specific skills that you teach in design and technology at Key Stage 1, e.g. cooking skills.

Think about how these skills are developed throughout the phase you teach in.

Supporting pupils to develop subject-specific skills

Seminar norms

Throughout the seminar please:

- keep your camera on
- mic muted if not talking
- ‘raise your hand’ if you wish to speak

Seminar objectives

By the end of this seminar you will:

- understand why it is important to identify the component parts of a skill
- have explored the differences between novice and expert learners
- know how to use modelling to help pupils develop subject-specific skills
- know how to use verbal and graphical representations to support the progression of skills
- have reflected on your practice and identified areas for development when planning and teaching key skills

ECF statements

Subject and curriculum (Standard 3 – Demonstrate good subject and curriculum knowledge)

3.2 Secure subject knowledge helps teachers to motivate pupils and teach effectively.

3.5 Explicitly teaching pupils the knowledge and skills they need to succeed within particular subject areas is beneficial.

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.

4.4 Guides, scaffolds and worked examples can help pupils apply new ideas, but should be gradually removed as pupil expertise increases.

Plan effective lessons, by:

- *Using modelling, explanations and scaffolds, acknowledging that novices need more structure early in a domain.*

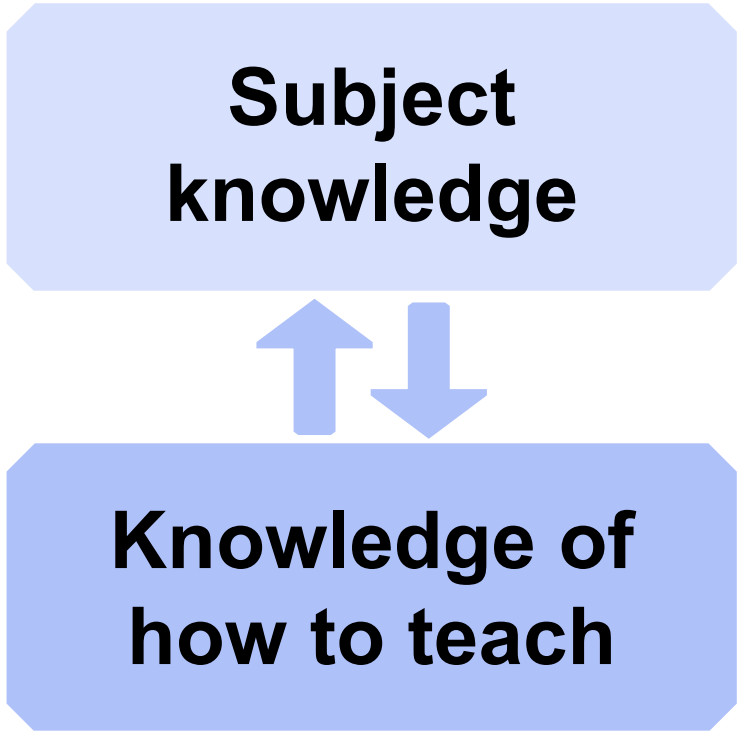
Make good use of expositions, by:

- *Combining a verbal explanation with a relevant graphical representation of the same concept or process, where appropriate.*

Model effectively, by:

- *Narrating thought processes when modelling to make explicit how experts think (e.g. asking questions aloud that pupils should consider when working independently and drawing pupils' attention to links with prior knowledge).*

Why teach subject-specific skills?



- Know what the component parts of the skill are.
- Identify which part you'll focus on.

Design and make

Developing knowledge and skills

Design and make

Design and make

Developing knowledge and skills
Design and make

Developing key skills:

- Key skills should be developed throughout the phases.
- Identify the component parts and decide which part to focus on.

- Design products.
- Explore and evaluate their own and existing products.
- Select and use a range of tools and equipment.
- Build structures and explore and use mechanisms.

The curse of knowledge

- Experts have more knowledge and they can much more easily retrieve this knowledge.
- Experts should not assume that others have the same level of knowledge.
- New knowledge must relate to and build on existing knowledge.

Think of a subject-specific skill that you have taught.

What prior knowledge would pupils need to have to perform the skill?

Teaching key skills

ECF: Plan effective lessons, by *using modelling, explanations and scaffolds, acknowledging that novices need more structure early in a domain.*

ECF: 4.4 Guides, scaffolds and worked examples can help pupils apply new ideas, but should be gradually removed as pupil expertise increases.

Novices

- need support to develop mental models
- need a structured approach to tasks
- use ‘thinking power’

Experts

- have well-developed, complex and organised mental models
- can be hindered by instruction
- use knowledge

Supporting pupils as they develop expertise

- Instructional procedures that work for novices can have a negative impact on experts.
- Removing scaffolds supports pupils as they develop proficiency in a skill.

Can you think of a time when you haven't provided enough structure when teaching a key skill?

What was the impact?

Teaching key skills

Modelling – Think aloud with demonstrations or worked examples

Give an explicit demonstration of a skill, task or procedure.

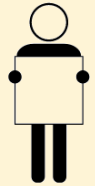
Combining verbal and graphical representations

Verbal explanation is combined with a relevant diagram or visual representation.

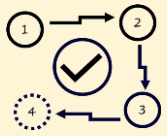
Modelling

- Explicitly modelling cognitive strategies helps to identify the steps needed to complete the skill.
- Pupils should have opportunities to practise the skill.

Think aloud



Demonstration



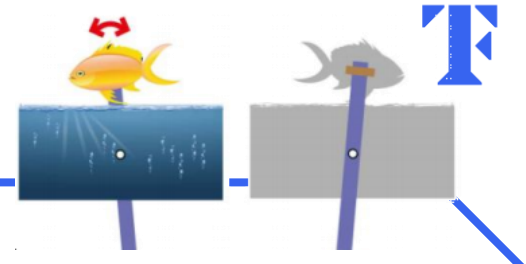
Worked or partially completed examples

Mechanisms: making levers

- Develop cutting, shaping and joining skills.
- Be able to use scissors, glue, masking tape and paper fasteners.
- Explore and evaluate existing products with mechanisms.
- **Design and make products with mechanisms, such as levers.**

Make a product with a lever mechanism

Designing and making levers



When using think aloud, teachers can expertly model their **cognitive processes** by:

- narrating their expert thoughts
- asking themselves questions
- correcting themselves

- How does the think aloud show the expert thinker's cognitive processes?
- How is think aloud used to support pupils' learning of the key skill?
- How might this impact pupils' learning?

Making the product:

To start, I am going to use my use my pencil to make a dot on the strip of card, my lever, so that I can make a hole for the pivot. The dot needs to be in the middle of the lever. I need to make sure that the hole isn't too close to the edge of the lever because the card might tear if it is.

Now I can make a hole using the hole punch. Next, I place the lever in the right position in the middle of the sea, on the back (*teacher models turning the card over so that the pencil mark is made on the back)*. I just need to check that there is enough room at the top for the fish and at the bottom for my hand to move the lever. I'm going to make a dot using the hole in the lever and then use the hole punch to make a hole in the sea.

Now I can use the paper fastener to attach the lever to the sea. I need to make sure the split pins are at the back so they can't be seen *(teacher models turning the card over so that the pupils can see how the paper fastener is used).* Now I can split the paper fastener at the back. I need to make sure that it isn't too tight so that the pivot works.

Finally, I can attach my fish to the top of the lever using masking tape. This doesn't look quite right. My fish is facing the wrong way. I can carefully peel off the masking tape and turn my fish over so that this time when I tape it, I am taping the back of the fish to the lever. That's better *(teacher demonstrates turning the fish and taping the back of it to the lever).*

Designing and making levers

Example B

Selecting materials:
I'm now going to make my own lever. I'm going to use some card for the sea and will cut some waves into it along the top. This piece of card can be used for the lever. It looks like the lever on the other one. I now need a strip of card for the handle. *I'm going to use this one (teacher selects a strip of card).* I am going to use the fish that I made yesterday. I designed my fish to look like a clown fish as that's my favourite kind of fish. It doesn't matter what your fish looks like, but remember you'll need to describe it in detail when we write our stories next week.

Making the product:
First, I need to attach the strip of card to the sea. Watch me make a hole in the card that I am using for the sea and the strip of card for my handle. Some of you might be tempted to just make the holes using the paper fastener, but this isn't safe, and the card might rip. I can now attach the card which I am using for the sea and the lever, watch carefully as I do this. Great, now I can use the masking tape to attach my fish to the top here, like this. Why have a I used masking tape instead of glue? *(Teacher asked a pupil to explain why masking tape has been used instead of glue).*

- What makes this example less effective?
- How could it be improved?

Reflection

Think about a time when you have taught a skill:

- Did you identify all the component parts to break it down?
- How did you use think aloud/demonstration to model?
- Could you have improved this further?

Combining verbal and graphical representations

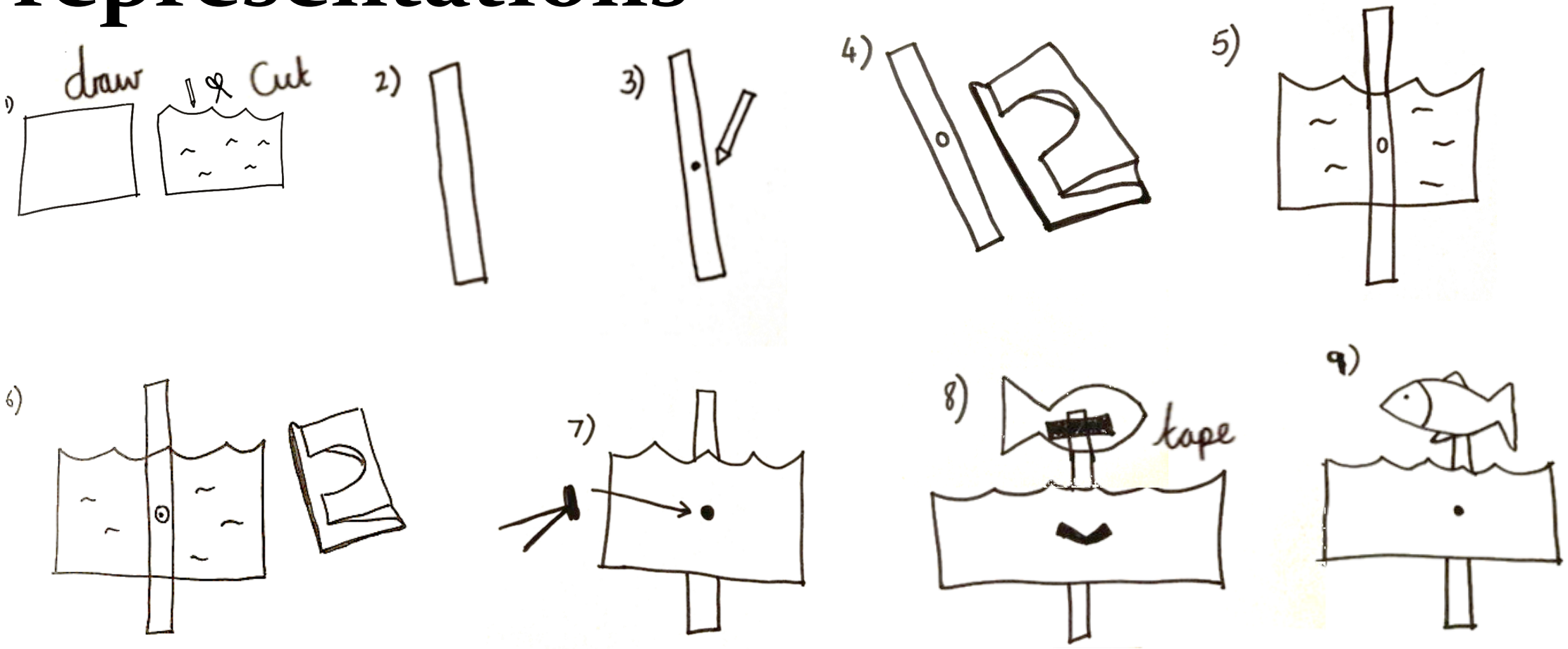
When combining verbal and graphical representations, effective practices may include:

Auditory and visual information is presented at the same time.

Dual coding can reduce load on the working memory.

1. Matching verbal and visual information.
2. Sharing verbal and visual information simultaneously.
3. Including detailed text to support pupil understanding.
4. Removing any unnecessary and irrelevant information.
5. Limiting the amount of information shared.

Combining verbal and graphical representations

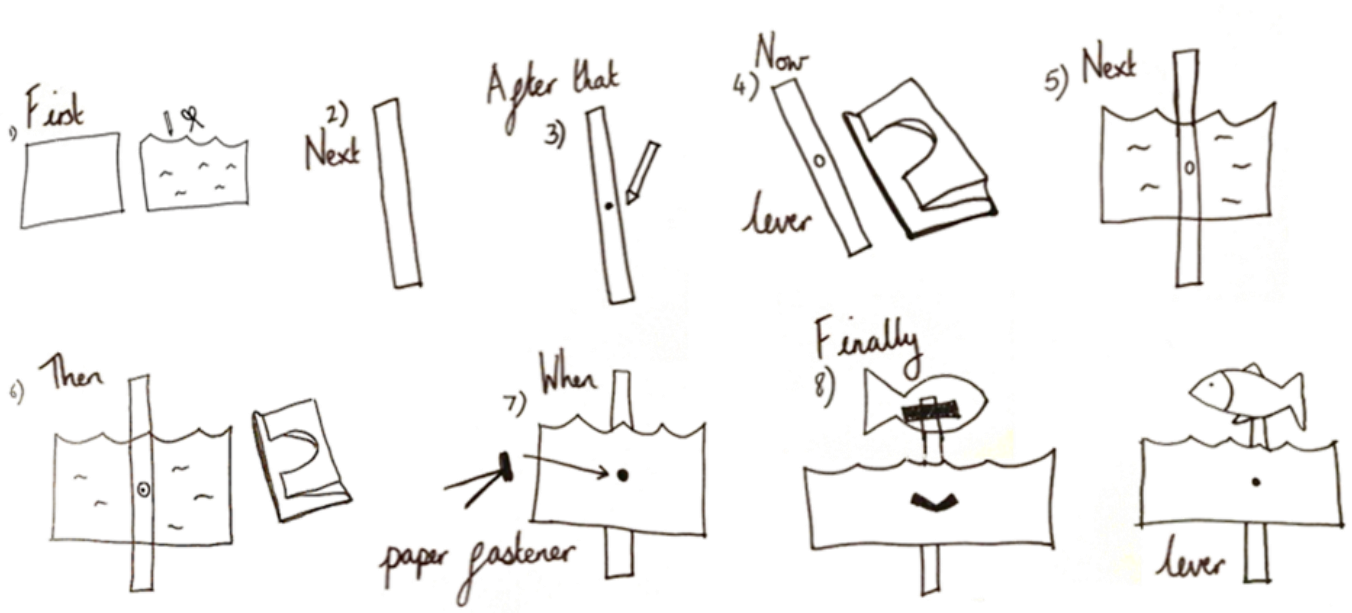


Combining verbal and graphical representations

You will need:
card for the background
card for your lever
your fish
a paper fastener
masking tape

Instructions:
1. First get a large piece of card for the background and decorate it to look like the sea.
2. Next select a long thin piece of card for the lever.
3. After that make a dot in the middle of the lever with a pencil.
4. Now use the hole punch to make a hole.
5. Next position the lever in the middle of the background card (the sea) so there is enough room at the top for the fish and enough room at the bottom to hold and move the lever.
6. Then make a dot with the pencil through the hole before using the hole punch to make a hole.
7. When you have made the hole in the sea, use the paper fastener to attach the lever to the background card to make the pivot. Make sure the lever is on the back of the sea.
8. Finally, attach the fish to the top of the lever using masking tape.
9. Turn your fish over and move the lever from side to side to operate the lever mechanism.

Developing writing skills



- How does the graphic organiser support the management of cognitive load?
- How can it be used to support pupils to develop writing skills?
- As a teacher, what would your next steps be?

Reflection

Think about the most recent skill you taught where you used graphical representation:

- Were all pupils successful in this skill?
- How did you combine the graphic with your verbal explanations?
- How could you have improved its use further?

Networks and resources

- The Design and Technology Association (DATA)
- Teach First Networks: The Primary Collective

Teach First | Teacher Development

Teach First

Thank you.

teachfirst.org.uk

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