

Imagine & Plan – Visualising

Taking the idea in my head and putting it into words and drawings so someone else can respond to it



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Progressing to be an Engineer –
The Approach. Royal Academy of
Engineering.

**Informed by work from St Mary's College, Derry
and Tonyrefail Community School**

The Progressing to be an Engineer Cycle



Overview

Imagine & Plan - Visualising – everything starts with a great idea. Ideas need to be explored, developed and communicated effectively. Visualising is a means of doing just this – by the use of words, sketches and/or 3D modelling. A good visualiser does not have to be a great artist. The key is enabling your audience to recognise what you’ve drawn.



ILOs	Key learning	Possible activities
<p>What do we want pupils to understand about Imagine & Plan – Visualising?</p>	<p>Pupils should understand the purpose of visualising:</p> <ul style="list-style-type: none"> ■ to explore and develop ideas ■ to plan and revise ■ to develop ideas collaboratively ■ to communicate those ideas to others <p>They should appreciate that there are different ways in which to visualise – not just by drawing. Often a combination of techniques should be used, depending on the complexity of the idea you wish to communicate.</p>	<p>Quick sketch:</p> <p>Challenge the pupils to sketch both simple and more complex objects. How recognisable are their efforts?</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. <u>No such thing as ‘can’t draw’</u> 2. <u>Visualise this</u>
<p>How do we want them to apply their knowledge?</p>	<p>Pupils should be exposed to and given the opportunity to try out a range of different visualising techniques. They should be encouraged to combine words and drawings/ models to achieve the best effect.</p> <p>This EHoM can be practised in all areas of the curriculum where a visual representation is required.</p>	<p>Living underwater:</p> <p>What would a habitat for an aquanaut look like?</p> <p>Activities:</p> <ol style="list-style-type: none"> 3. <u>Underwater habitat</u>





	From	To	Towards
	Suggested 5–7 years	Suggested 7–11 years	Suggested 11–14 years
Pupils should be taught to:	Communicate their ideas in words and simple sketches.	Use simple annotated sketches to turn ideas into words and drawings.	Use detailed annotated sketches to turn ideas into words and drawings to create a design specification.
Success was demonstrated when pupils:	<ul style="list-style-type: none">talked about their ideas using drawings or diagrams to help them explain.	<ul style="list-style-type: none">conveyed their ideas, parts of a product or system, in a visual way that could be interpreted or identified by others.	<ul style="list-style-type: none">produced a logical and systematic series of sketches to explain an idea in a visual way.



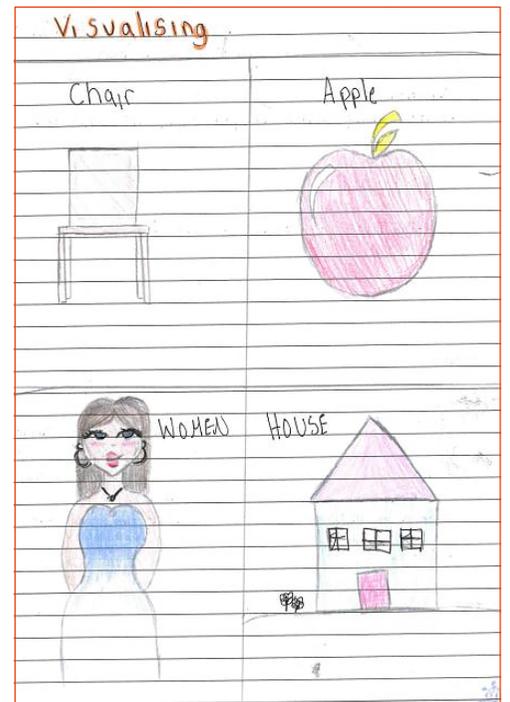
Generic task

Initial learning activity - eliciting and developing understanding

No such thing as 'can't draw' - getting started

The pupils were asked to sketch some basic objects - chair, woman, apple and house - and then share their efforts with their elbow partner. This was followed by the sketching of some more complex examples where further thought was potentially needed. The emphasis was on rough, quick drawings.

“Students had a lot of positive reactions to this activity.”



“Students had a lot of positive reactions to this activity.”

We spent time after students had completed their sketches to swap work with a peer and then to give their peer verbal feedback.

This reinforced the message that everyone can sketch and be successful in this task.”

Generic task

Initial learning activity - eliciting and developing understanding

Visualise this - applying what you know

The pupils were then asked to use their visualising skills to sketch a pen for a variety of users: someone who always loses things; a two-fingered person (pinkie & index); a child who finds it hard to concentrate in class.

“Students responded to the task in very different ways.”

A pen for someone who always loses things

Visualise this

A pen for: Someone who always loses things

Camera
Tracker
speaker for alert
lights up if lost
lights up - once found you can twist it slightly and the light will turn off. Flashes/changes colour
Comes with an QR code you can scan that will take you to an app

which you can then connect to the app. Then if you lose the pen you can press a button on the app which will send an alert noise through the speaker so you can find it. There is a tracker which you can also see where the pen is. The camera is another feature to help you locate the pen. you can access the camera feature through the app. You can make the light flash, or fade or you can select a colour in the settings section of the app. The charger can also connect to the app. Pen battery can last up to 24 hours and can get fully charged in just 30 minutes.

Visualise a pen for:
Someone who always loses things

a string so you can tie it to something
a magnet so it can attach to something
SIDE 1
Often Einstein The simple ideas are the best - the ones you know will work!
Cooling 5 Nov 21
SIDE 2
velcro
sticker to stick it to things
14cm
1cm

“Students responded to the task in very different ways.

The first student went down the electronic solution route and a number of others produced designs which included electronics, apps, trackers etc.

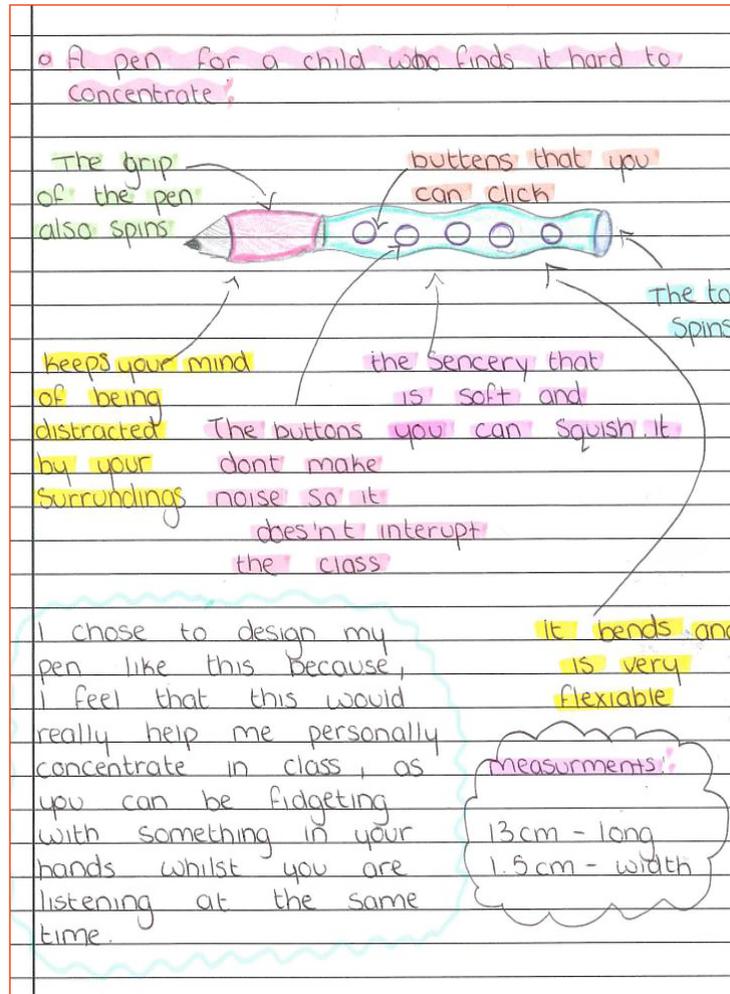
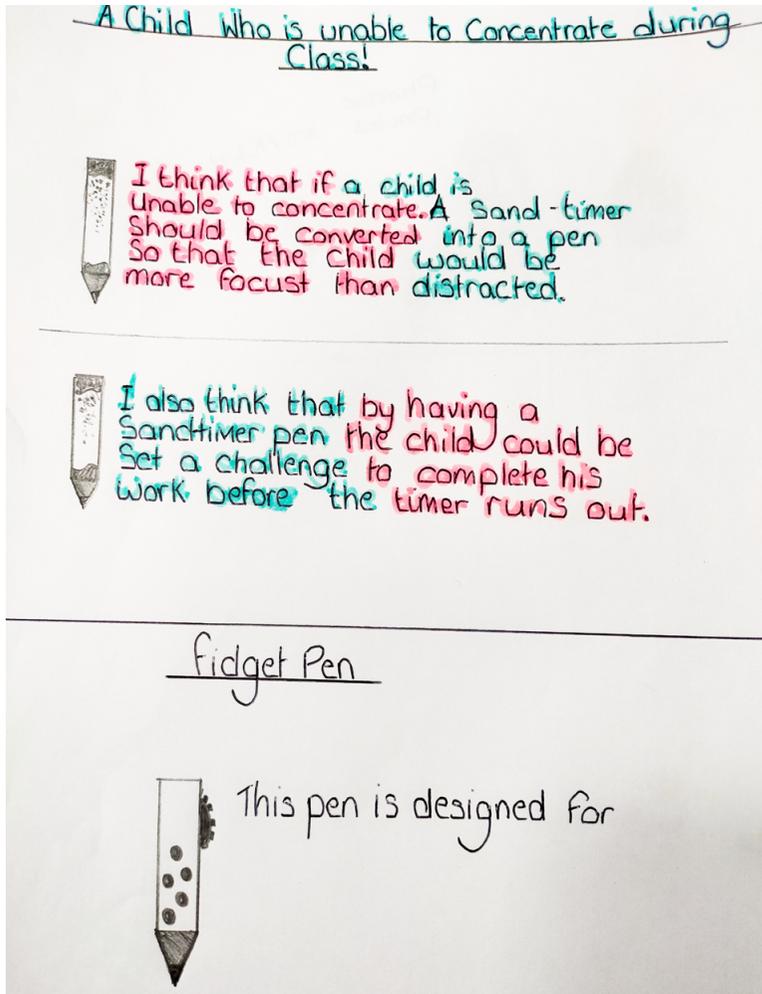
The second solution was much more simple and it is interesting to see what this student was thinking.”

Generic task

Initial learning activity - eliciting and developing understanding

A pen for a child who find it hard to concentrate in class

“Students who chose this task related very well to it.”



“Students who chose this task related very well to it.

They had experience of family members or friends who they believed had this issue and would benefit from a similar product.

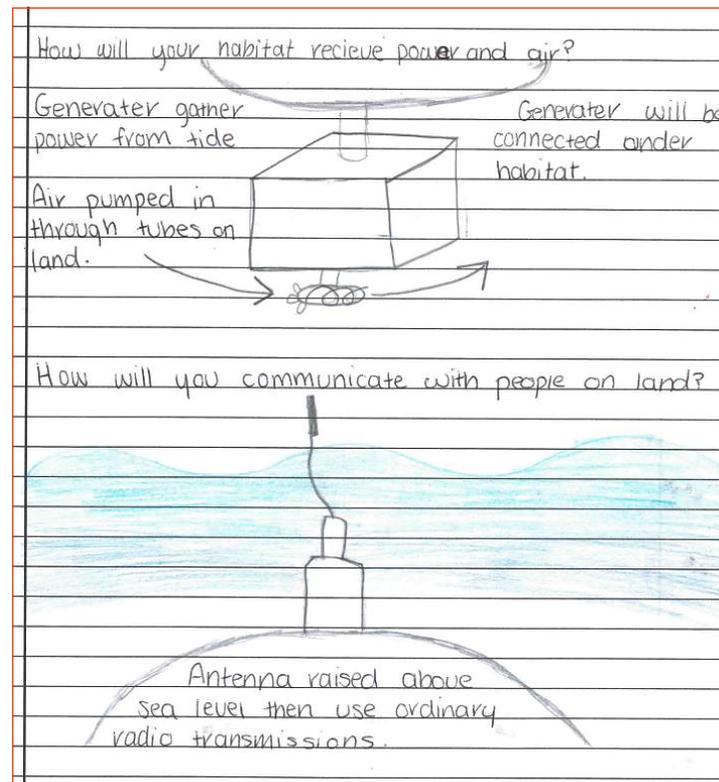
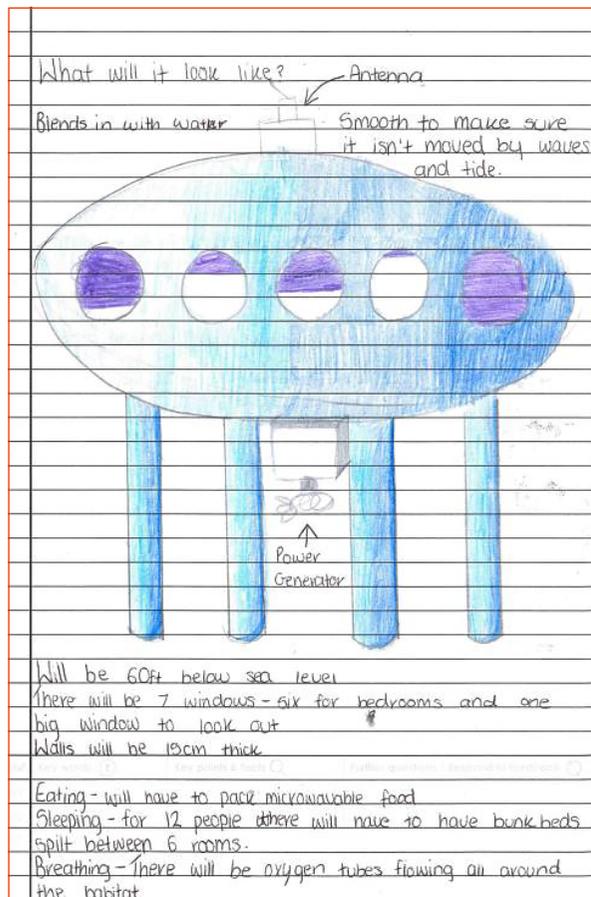
The solutions offered were more creative than those that adults would have come up with!”

Embedded task

Exploring the EHoM in context

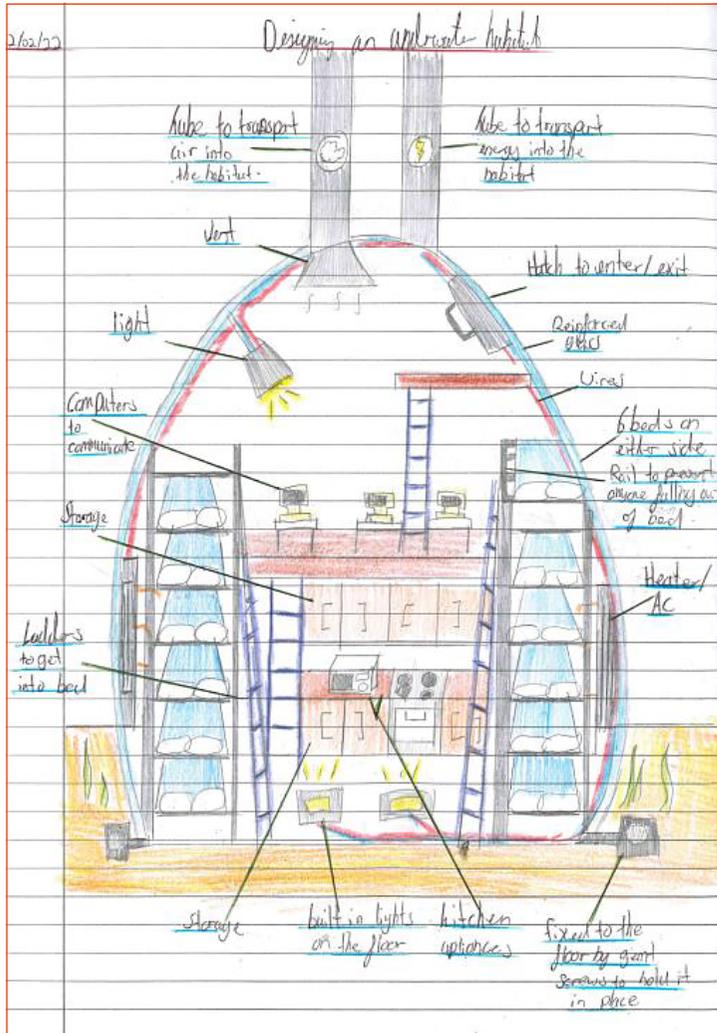
Living underwater

Designing an underwater habitat: Pupils were introduced to the term 'aquanaut' - a diver who lives in an underwater habitat for longer than 24 hour periods. They were asked to think about the challenges that someone living underwater would face, and offer potential solutions. They were then tasked with visualising an underwater habitat which communicated their ideas effectively.



Embedded task

Exploring the EHoM in context



Living Underwater

What would be the positive, negative and interesting aspects of living underwater?

Positive aspects of living underwater?

- You are able to explore more environment and sea-creatures.
- You could see ~~more~~ what happens underwater.

Negative aspects of living underwater

- Not been being able to see family often
- May run out of oxygen
- Could run out of food

Interesting aspects of living underwater

- Find out more about sea life
- How creatures act underwater
- See how the sea bed is like

a.k. What kind of challenges would you face if you lived underwater?

- Not a lot of light
- Lack of oxygen
- Lack of food
- Cold temperatures
- Immense pressure

“Pupils enjoyed taking part in the activity and the discussion went very well, with students asking questions and offering their own information confidently. Many solutions were offered orally to the challenges faced by living under water. Questions asked regarding the future and if we might need to live underwater or if we might holiday underwater were thought provoking.”



Teachers' ideas to extend and support thinking

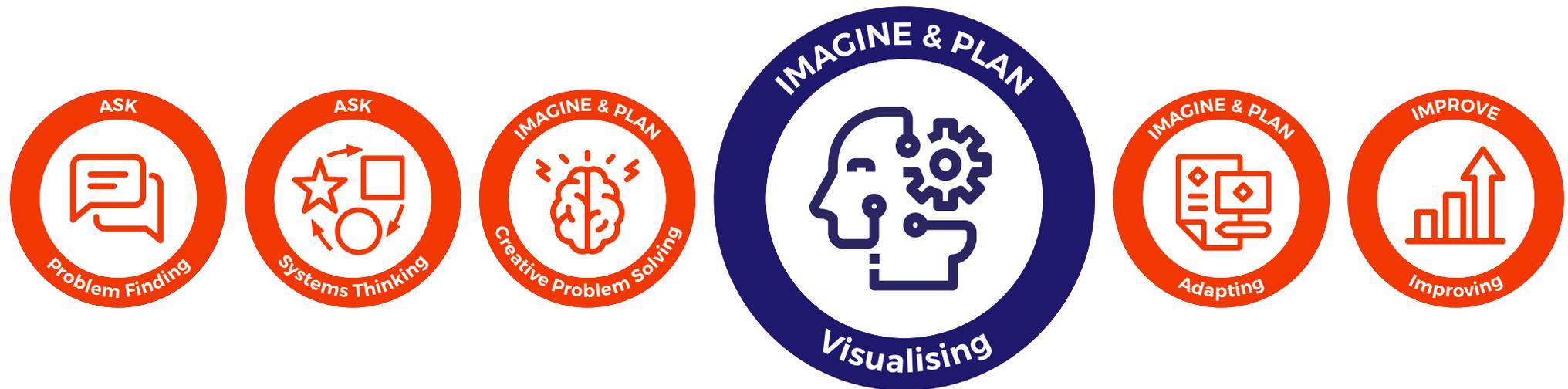
Extending

A useful video to watch to stimulate discussion:
What if we lived in underwater cities:

<https://www.youtube.com/watch?app=desktop&v=klelwY5ZBxU>

Further support

Pupils may struggle as they will probably have little if any knowledge of aquanauts or living underwater. As this is outside their own experience it may be daunting to some. Initial discussion and access to examples are therefore key to generate ideas to help with designs.





Imagine & Plan – Visualising

Taking the idea in my head and putting it into words and drawings so someone else can respond to it

FROM – communicating ideas in words and simple sketches.

TO – using simple annotated sketches to turn ideas into words and drawings.

TOWARDS – using detailed annotated sketches to turn ideas into words and drawings to create a design specification.