'What is this STEM approach everyone is talking about and how can I integrate it to best maximise student engagement?'

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“In our world today, what is a student more likely going to need to be able to write: an essay or a blog post?”

“We rarely create something different until we experience something different.”

#InnovatorsMindset


TODAY
IS
THE DAY

STEM vs STEAM

STEM

According to Ge, Ifenthaler, and Spector, (2016) STEM is defined as “academic and professional disciplines associated with science, technology, engineering and mathematics; typically conceived of separately, with sub-disciplines, although new pedagogical approaches encourage cross-disciplinary learning in areas” (p.5).

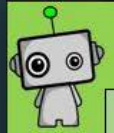
STEM is an interdisciplinary approach to teaching

Interdisciplinary

relating to more than one branch of knowledge.

Therefore, for STEM to be truly effective in the classroom you MUST integrate two or more areas in STEM into your lesson/unit

Application of Computational Thinking Across the Curriculum!



Decomposition

Breaking something down into smaller parts

Primary Terminology – "Break Apart"

Early Years Foundation Terminology – "Pieces"

What equipment do you need for school today?

What were the key events of the 20th Century?

What countries make up Europe?

Write a list of shopping items

Identify the playing positions in a rugby team

Play Charades!

Break the story of Romeo and Juliet down into it's main sections

Break down a word phonetically

Organise a birthday party! What will you need to think about?

Identify the instruments used within a song

Top trumps!

How does your post get to you?

Break down a typical day at school

Identify the different parts of a bike What components make up the wheel?

Build a computer game using scratch. Think about graphics, levels, character…

Pack a bag for your summer holiday

Write down a list of ingredients for a Victoria sponge cake

What characters will you create for your story?

What information do you need to work out the circumference of a circle?

How did Wales do in Euro 2016?

Explain the movements for the different pieces in a game of chess

Application of Computational Thinking Across the Curriculum!

Pattern Recognition

Looking for similarities or trends

Primary Terminology – "Patterns"
Early Years Foundation Terminology – "Matching"

"That word sounds like..."

Critically review an existing piece of work.

Give feedback comparing work to specific criteria

Correct application of Male/Female tenses

Sudoku

Solitaire

Chess tactics

Logic puzzles

Does the star wars and superman theme tunes sound the same?

Preferred playing positions in a sport

What do platform computer games have in common?

Pattern and sequence matching

Spot the difference

Code breaking

Days of the week/Month

Identify gradients /contours in an OS map to measure steepest route

What drawing technique would be best to use for that style of image?

"What tactics worked well the last time we played them?"

Times tables

Identify similar rifts within a song

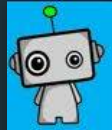
Word search

Sorting and classifying activities

Fit shapes into correctly shaped holes

Maths patterns, e.g. Fibonacci series (1,1,2,3,5,8,13,21...)

Application of Computational Thinking Across the Curriculum!



"What did you learn in todays lesson?"

Write a long term training plan

Write a blurb for your movie

Crosswords

Draw a picture of your family

What noise does a dog make?

Following a subway map

Write a match report

Create a model

What are the key skills you need to be a good Hockey player?

Draw a cartoon

Write a synopsis of your story

Explain your idea in 30 seconds!

Articulate

Draw a concept design

Abstraction

Focusing on what's important, ignoring what is unnecessary

Primary Terminology – "Thoughts"

Early Years Foundation Terminology – "Ideas"

Recreate the image

Explain briefly what will happen in your computer game.

Recreate the Eiffel Tower in Mine craft!

Who is David Beckham?

What are the key calculations required within the formula?

From your research, summarise your key findings.

"What's your plan for the weekend?"

Demonstrate the technique used to ...

Do an impression of...

"What's the weather forecast for today?"

Charades

What happened to Henry VIII's wives?

"How does that song go again?"

Application of Computational Thinking Across the Curriculum!

Algorithmic Design

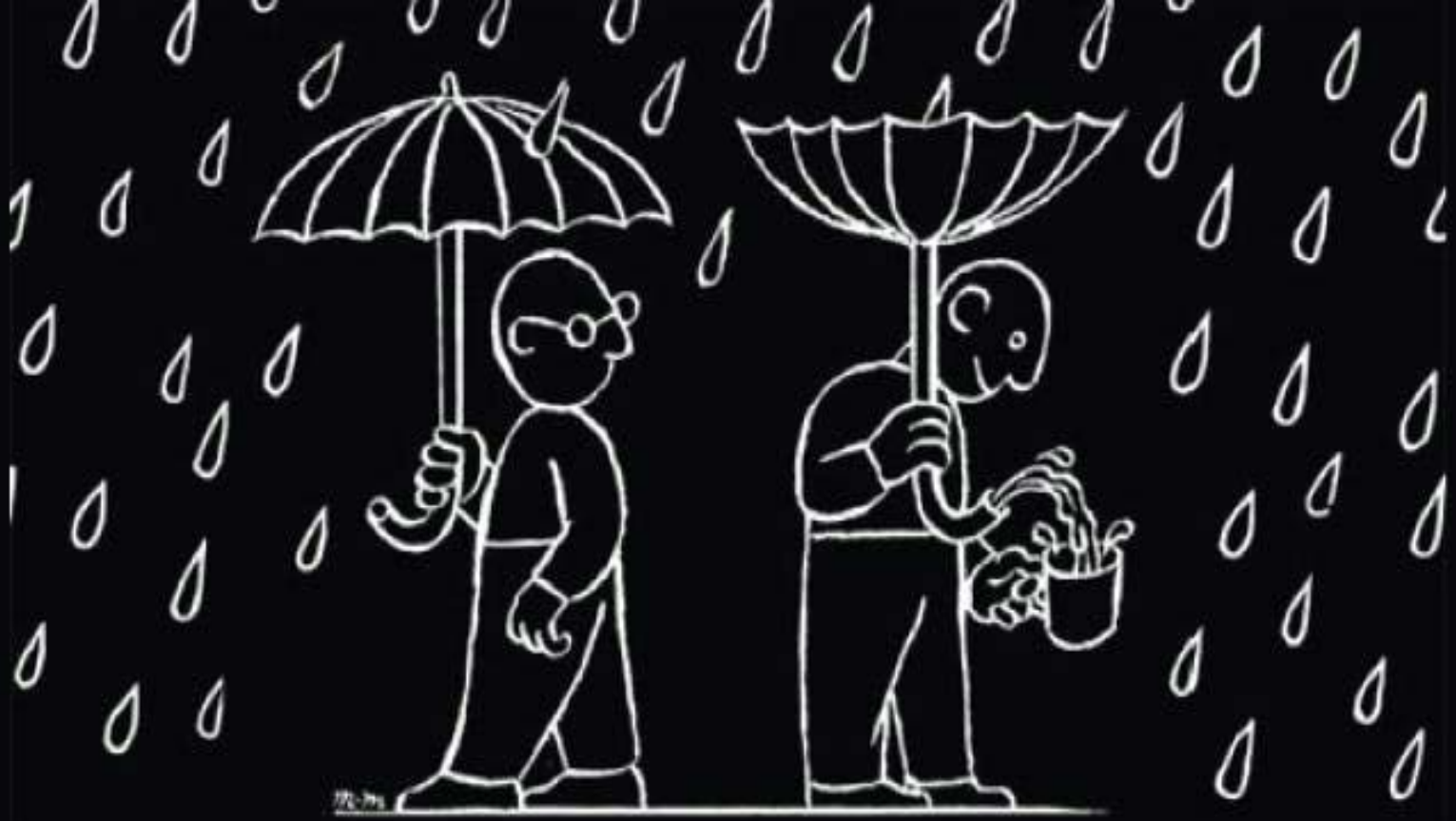
Create a set of step-by-step instructions to complete a task

Primary Terminology – "Instructions"

Early Years Foundation Terminology – "Plan"

- Draw a map
- Explain the process of photosynthesis
- Write a piece of music
- Write an algorithm to show how your computer game character will move.
- Write a short term training programme
- Create a timeline of events for WWII
- Create a paint by numbers
- Making patterns
- Create a storyboard for an animation
- Create a phrase book
- Write a recipe for ...
- Write out the steps for conducting your experiment
- Choreograph a dance / gymnastics routine
- Create a tactical playbook
- Create an origami
- Dot to dot
- Write a shopping list
- Build a pirate ship out of Lego
- Create a blueprint to design a ...
- Draw a diagram to show the water cycle
- Create a family tree
- Create a flowchart to show how you would ...
- Speed cup stacking!
- Create a how 2 guide so someone else can recreate your drawing
- Create a coaching card for the tennis serve

“Any time teachers think differently about who they teach and how they teach, they can create better learning opportunities. Questioning what we do and why we do it is essential for innovation.”



INNOVATION IS A STATE OF MIND

“Our role is to empower students to see themselves as innovators who take responsibility for their own learning and leading.”

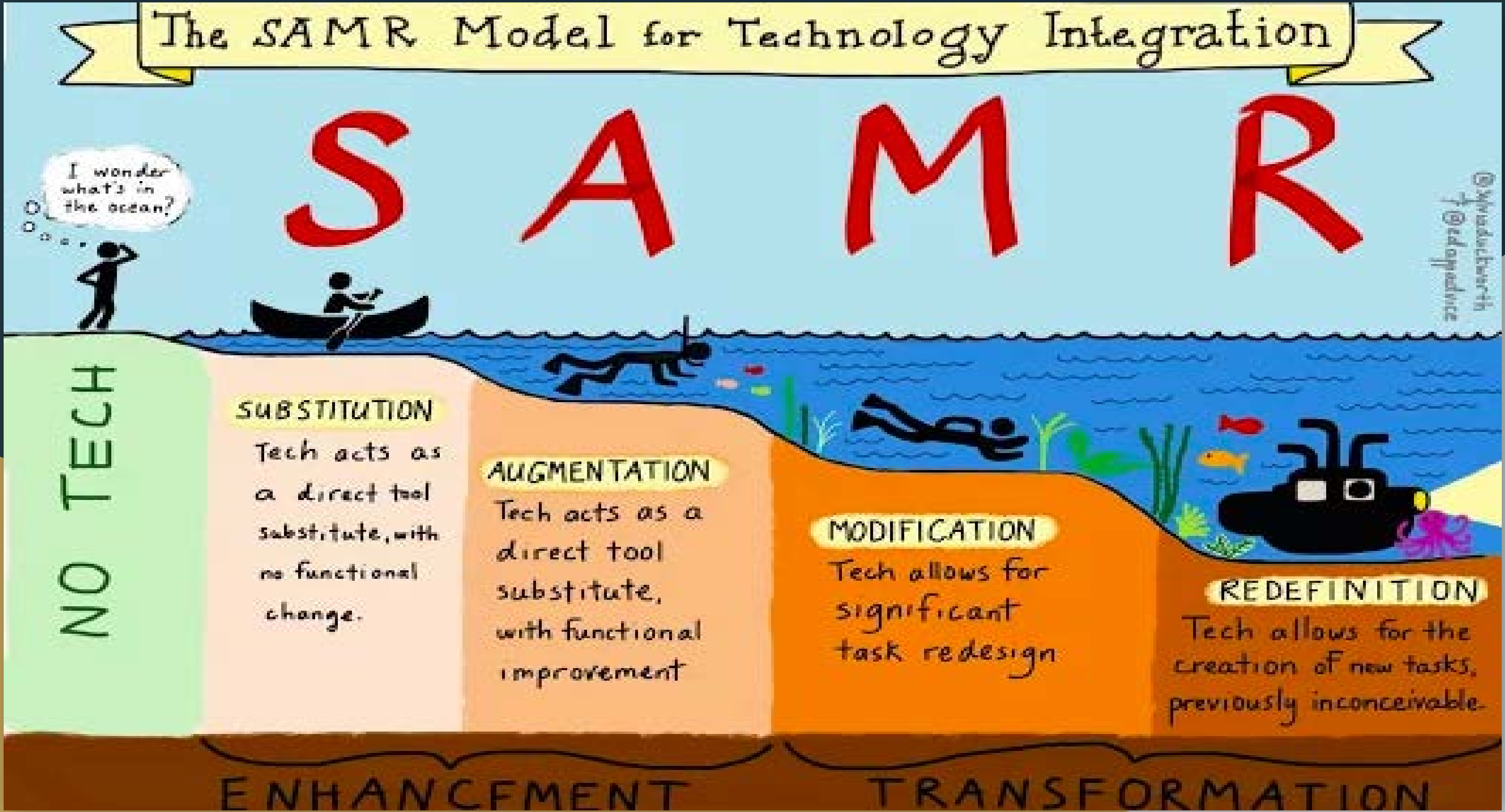
Wonderings

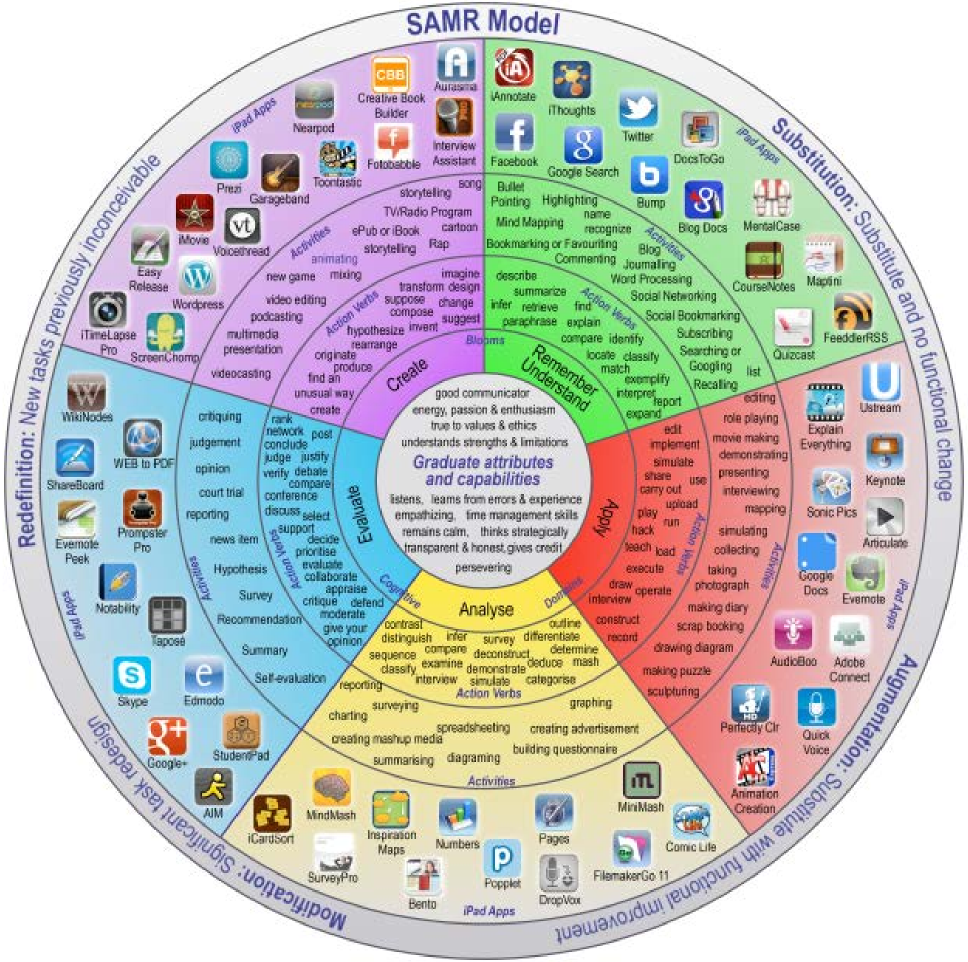
It doesn't matter how many resources you have.

If you don't know how to use them,
it will never be enough.

“Change is an opportunity to do something amazing”

#InnovatorsMindset


The SAMR Model for Technology Integration
S A M R
I wonder what's in the ocean?
NO TECH
SUBSTITUTION
Tech acts as a direct tool substitute, with no functional change.
AUGMENTATION
Tech acts as a direct tool substitute, with functional improvement
MODIFICATION
Tech allows for significant task redesign
REDEFINITION
Tech allows for the creation of new tasks, previously inconceivable.
ENHANCEMENT
TRANSFORMATION



SAMR Model
Substitution: Substitute and no functional change
Augmentation: Substitute with functional improvement
Modification: Significant task redesign
Redefinition: New tasks previously inconceivable
Graduate attributes and capabilities
good communicator
energy, passion & enthusiasm
true to values & ethics
understands strengths & limitations
listens, learns from errors & experience
empathizing, time management skills
remains calm, thinks strategically
transparent & honest, gives credit
persevering
Create
Remember Understand
Apply
Analyse
Evaluate
Blooms
Cognitive
Domains
Action Verbs
Activities
iPad Apps
Aurasma
Creative Book Builder
Nearpod
Interview Assistant
Fotobabble
Toontastic
Garageband
Prezi
iMovie
Voicethread
Easy Release
Wordpress
iTimeLapse Pro
ScreenChomp
song
storytelling
TV/Radio Program
cartoon
ePub or iBook
Rap
animating
mixing
new game
video editing
podcasting
multimedia presentation
videocasting
imagine
transform
design
suppose
change
compose
invent
suggest
hypothesize
rearrange
originate
produce
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create
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Facebook
Google Search
Bump
Blog Docs
MentalCase
CourseNotes
Maptini
FeedlerRSS
Quizcast
Bullet Pointing
Highlighting
Mind Mapping
name
recognize
Bookmarking or Favouriting
Blog
Commenting
Journaling
Word Processing
Social Networking
Social Bookmarking
Subscribing
Searching or Googling
Recalling
list
describe
summarize
infer
retrieve
find
paraphrase
explain
compare
identify
locate
classify
match
exemplify
interpret
report
expand
Ustream
Explain Everything
Keynote
Sonic Pics
Articulate
Google Docs
Evernote
AudioBoo
Adobe Connect
Perfectly Clr
Quick Voice
Animation Creation
editing
role playing
movie making
demonstrating
presenting
interviewing
mapping
simulating
collecting
taking photograph
making diary
scrap booking
drawing diagram
making puzzle
sculpturing
edit
implement
simulate
share
use
carry out
upload
play
run
hack
teach
load
execute
draw
interview
operate
construct
record
MiniMash
Comic Life
Pages
FilemakerGo 11
DropVox
Poppet
Numbers
Inspiration Maps
Bento
SurveyPro
MindMash
iCardSort
graphing
creating advertisement
building questionnaire
spreadsheeting
diagraming
summarising
creating mashup media
charting
surveying
reporting
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differentiate
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deduce
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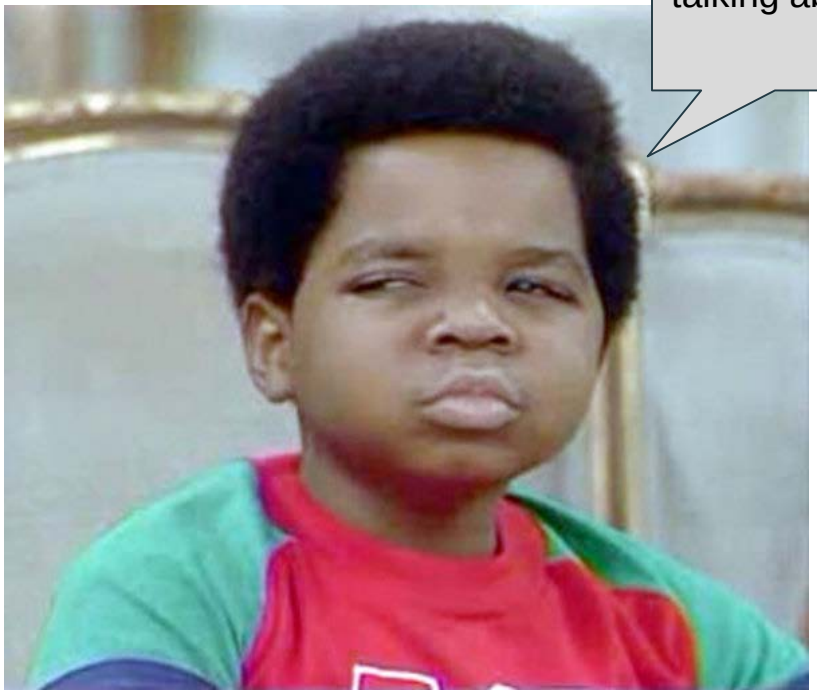
sequence
classify
interview
WikiNodes
WEB to PDF
ShareBoard
Prompster Pro
Evernote Peek
Notability
Tapose
Skype
Edmodo
Google+
StudentPad
AIM
critiquing
judgement
opinion
court trial
reporting
news item
Hypothesis
Survey
Recommendation
Summary
Self-evaluation
rank
network
post
conclude
judge
justify
verify
debate
compare
conference
discuss
select
support
decide
prioritise
evaluate
collaborate
appraise
critique
defend
moderate
give your opinion

Picture Book STEM

Future Focused Learning



What are the future focused learning principles?

Collaboration

Communication

Critical Thinking

Creativity