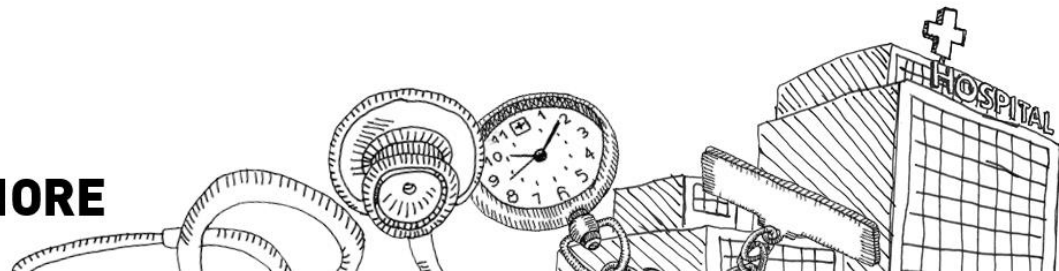

Keep Calm
and
Carry a Pentagon

holmesglen

A tool designed to help vocational students with numeracy

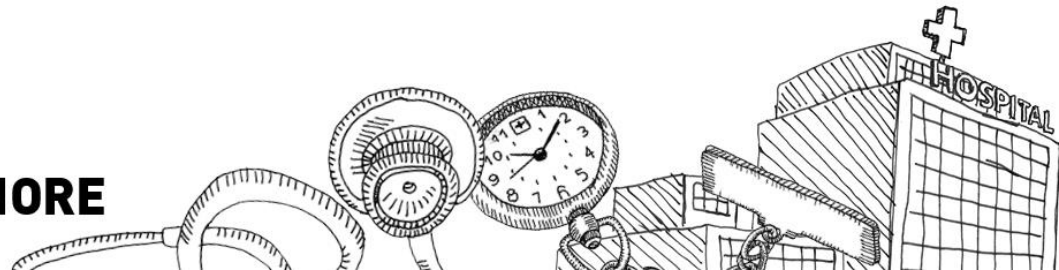
What this presentation will cover

- Some issues around numeracy
- How numeracy issues affect us.
- What can be done about it. (maybe!)



Three perspectives

1. Sam – a student
2. Beth - a teacher of nursing
3. Ryan - an employer



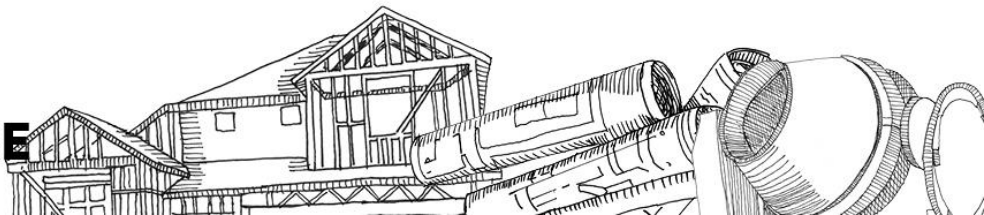
Ryan

Can't get good workers.

- not worth employing or
- not worth keeping.

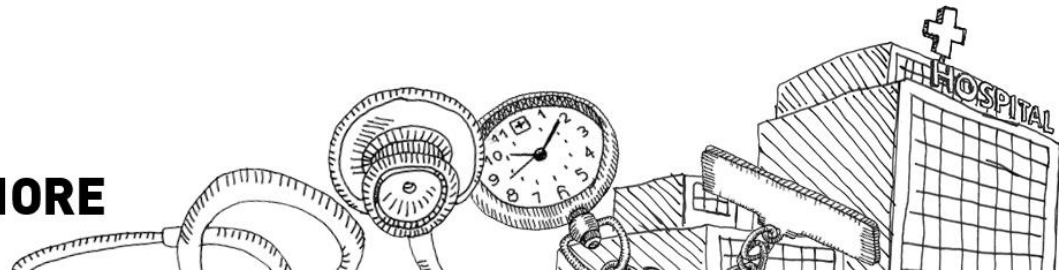
Basic numeracy skills are lacking

PRODUCTIVITY



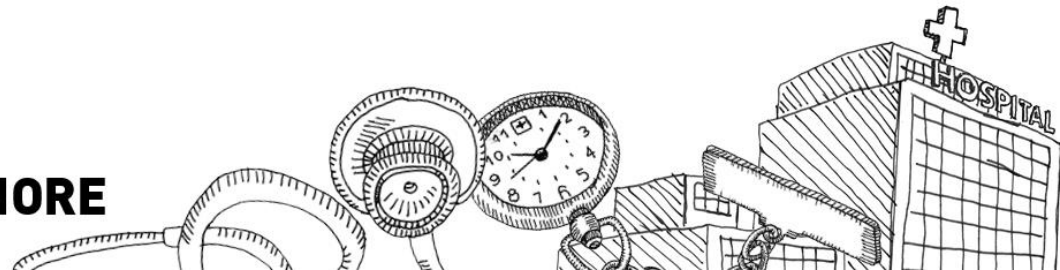
What does Ryan do?

- Blames the TAFES
- Blames the schools



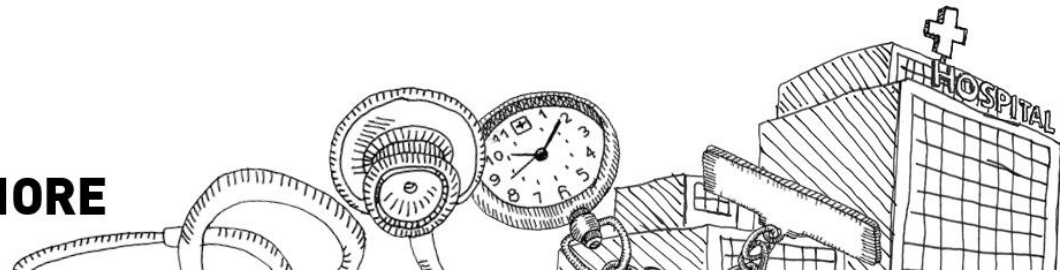
Beth

- Teaches nursing.
- Hates maths.
- Finds that a lot of her students have difficulty with the parts of the course that require numeracy skills.



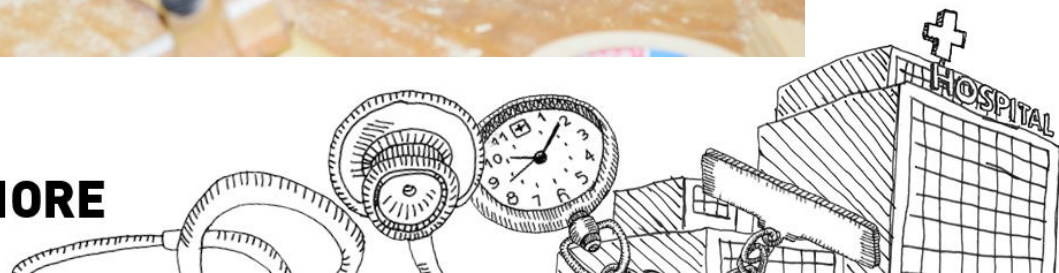
So what does Beth do?

- tries to explain how to do numeracy problems.
- advises students to see a LLN specialist.



Sam

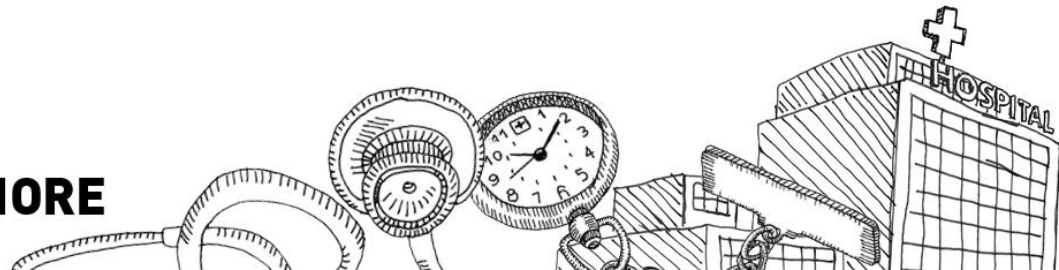
- wants to become a carpenter.
- a solid "at level / approaching level" school student.
- tries to avoid doing maths.



The government is not happy

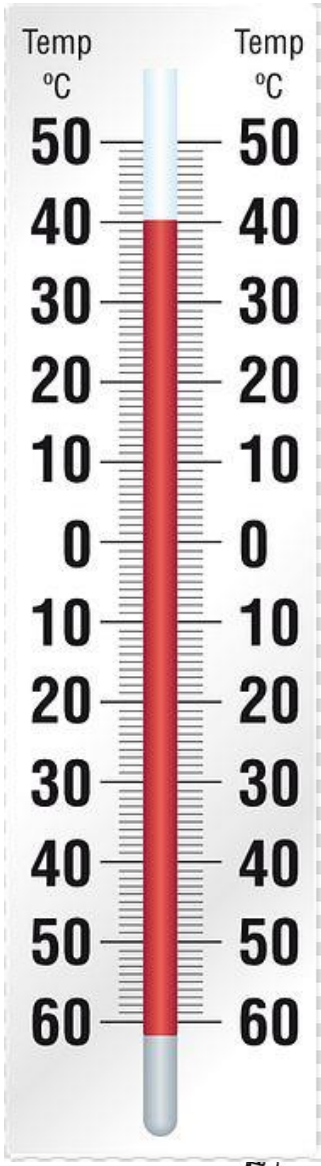
We have a big problem.

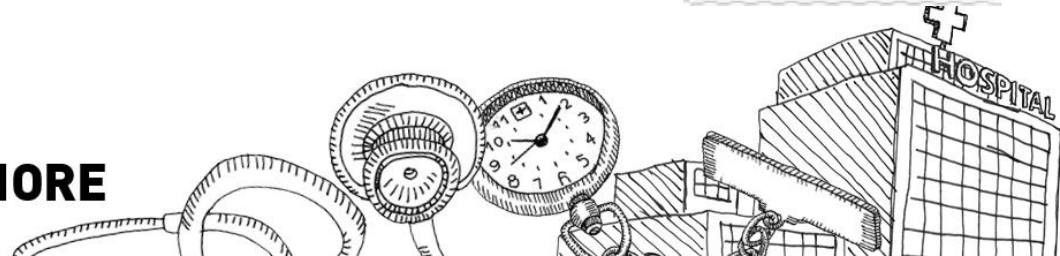
About 50% of Australians aged 15 and up have numeracy skills below Australian Core Skills Framework (ACSF) level 3.



Having numeracy skills below level 3….

- don't know how to convert from grams to kilograms, from a percentage to a fraction
- cannot use and apply 2D or 3D shapes in different contexts
- can't read a temperature gauge or a blood pressure machine.





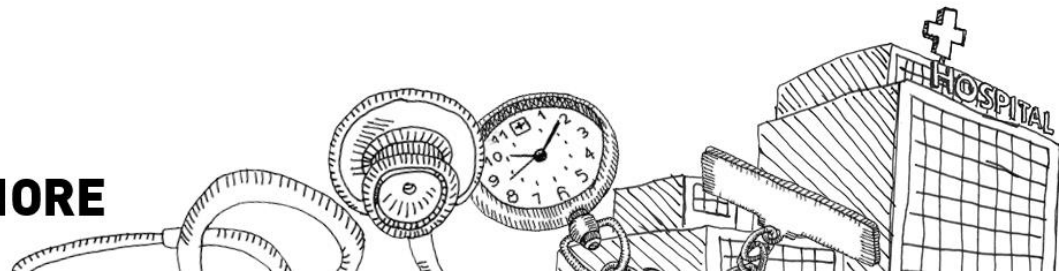
Activity:

Pick the ACSF level

National Foundation Skills Strategy

- 2012
- Focus: workforce development of adults in numeracy and literacy.

- **"by 2022, at least two thirds of working age Australians will have the literacy and numeracy skills at Level 3 or above."**



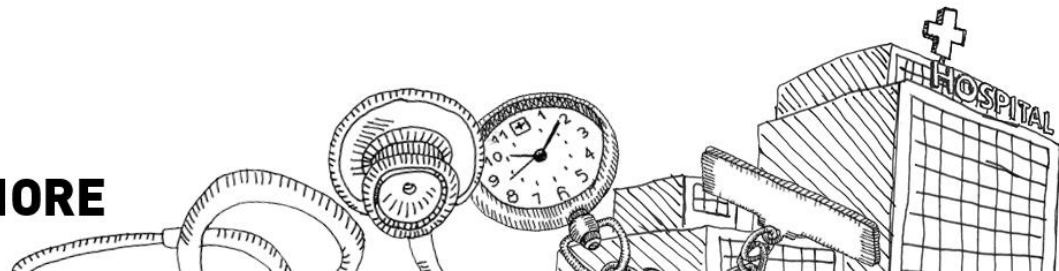
Foundation skills

What are they?

skills which include skills for work and numeracy, language and literacy skills.

Where are they?

They are incorporated into every unit of competency in every VET course



Embark and clarify

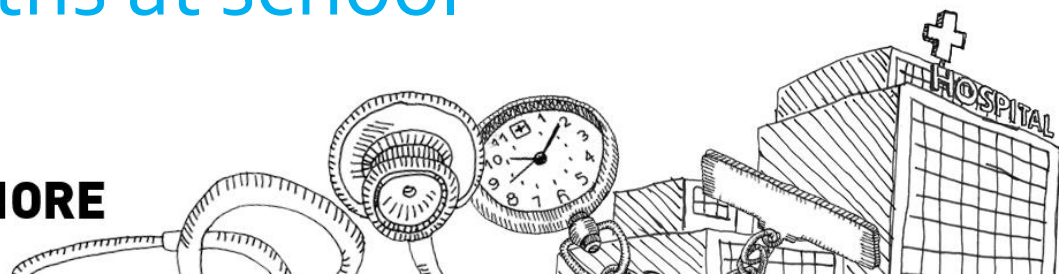
LEARN MORE, DO MORE, GROW MORE

Teachers

- Often have low confidence in their own numeracy skills
- Are not trained in teaching numeracy

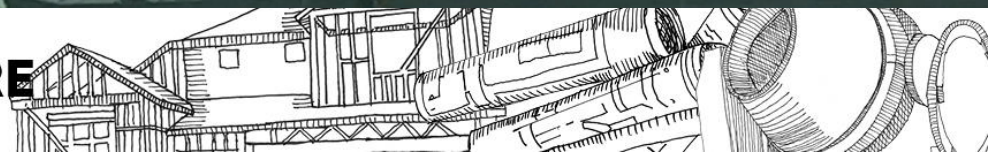
Students

- Are interested in learning skills for a job, not numeracy
- Many disliked maths at school
- Are anxious



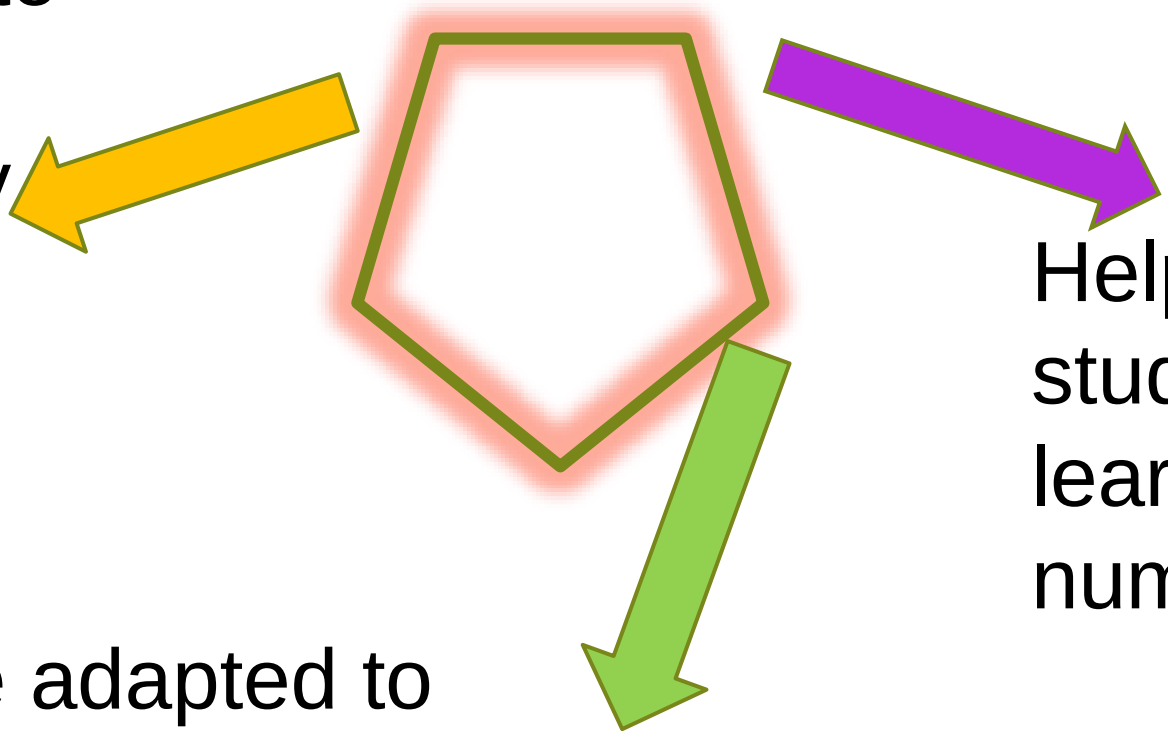
Find and generate

LEARN MORE, DO MORE, GROW MORE



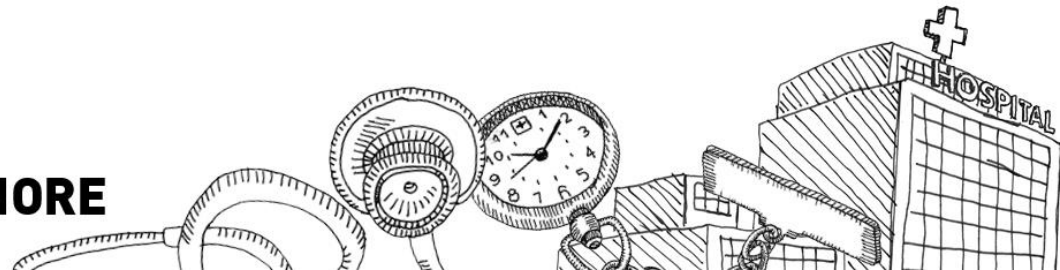
We need a tool which…

Helps teachers to explain numeracy



Helps students to learn numeracy

Can be adapted to suit any course



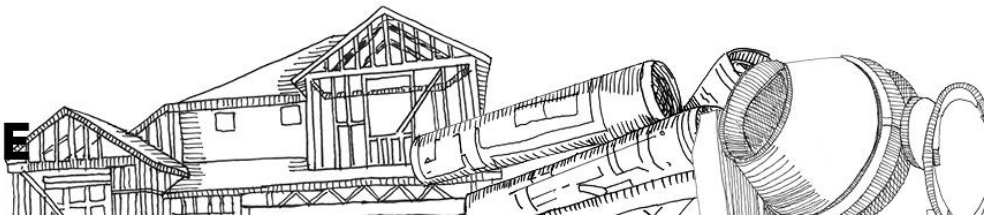
Evaluate and reflect

Models of Engaged Learning and Teaching

- Research Skill Development framework (2006)
- Work Skill Development framework (2009)
- Clinical Reflection Framework (2012)
- Optimising Problem Solving Pentagon (2014- created by students for students)
- Research Mountain (2014)

www.rsd.edu.au

www.melt.edu.au



https://www.adelaide.edu.au/rsd/

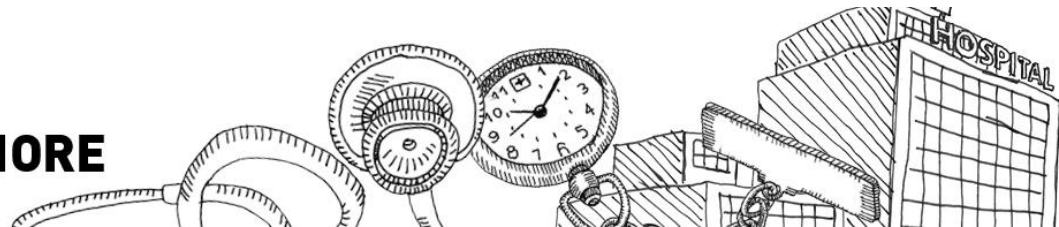
Examples by Discipline

Examples of uses of the RSD framework to inform assessment and curriculum design. Click on one of the following disciplines for more information:

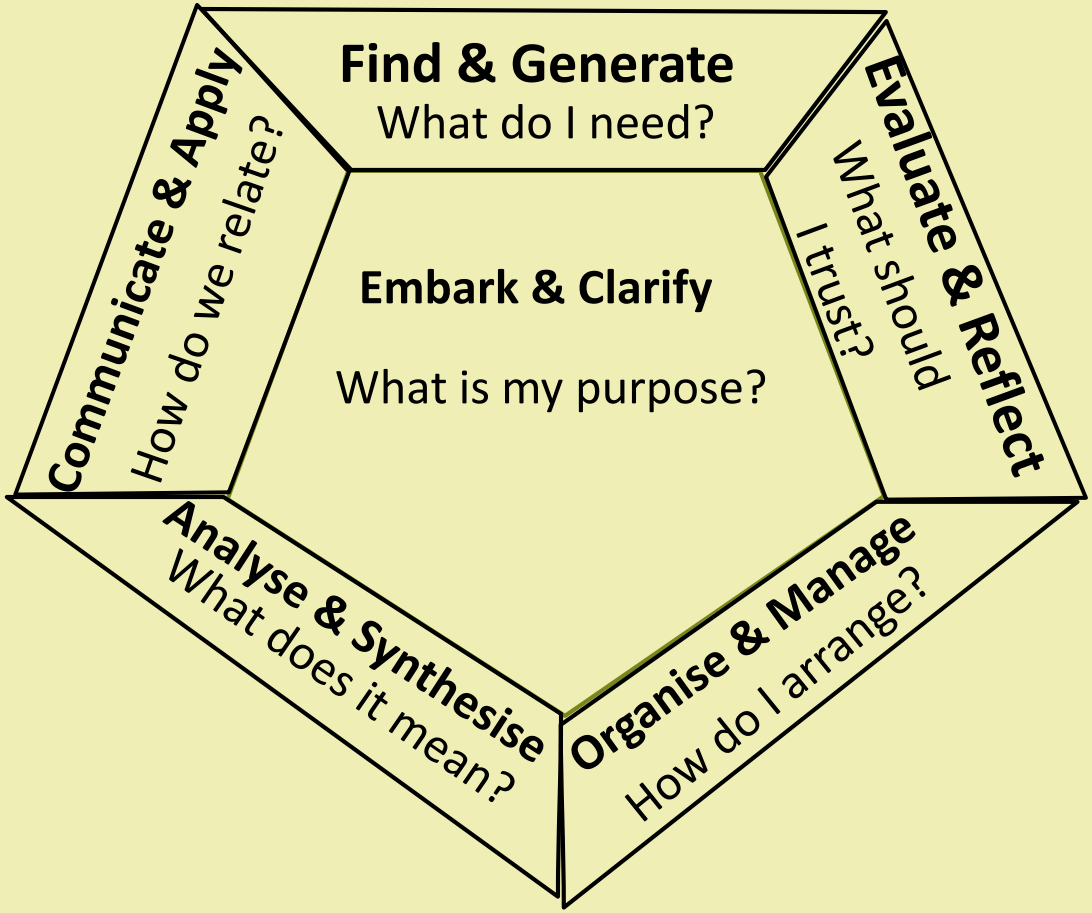
Alphabetical List of Disciplines, with Linked Assessment Resources

- Accounting
- Business Law
- Dentistry
- Electronic Engineering
- HR Management
- Management
- Oral Health
- Population
- Software Engineering
- Tourism
- Animal/Vet Sciences
- Chemistry
- Dietetics
- English/Communication
- Human Biology
- Media
- Paramedics
- Psychology
- Statistics
- Biology/Marine Science
- Computer Science
- Education
- Geography
- Language/Literature
- Medical Science
- Pharmacy
- Public Health
- Student Development
- Business Ethics
- Development
- Education/Technology
- History
- Law
- Medicine
- Physics
- Social Work
- Sustainability

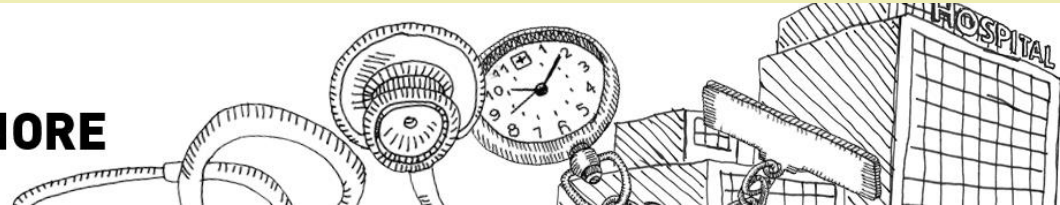
LEARN MORE, DO MORE, GROW MORE



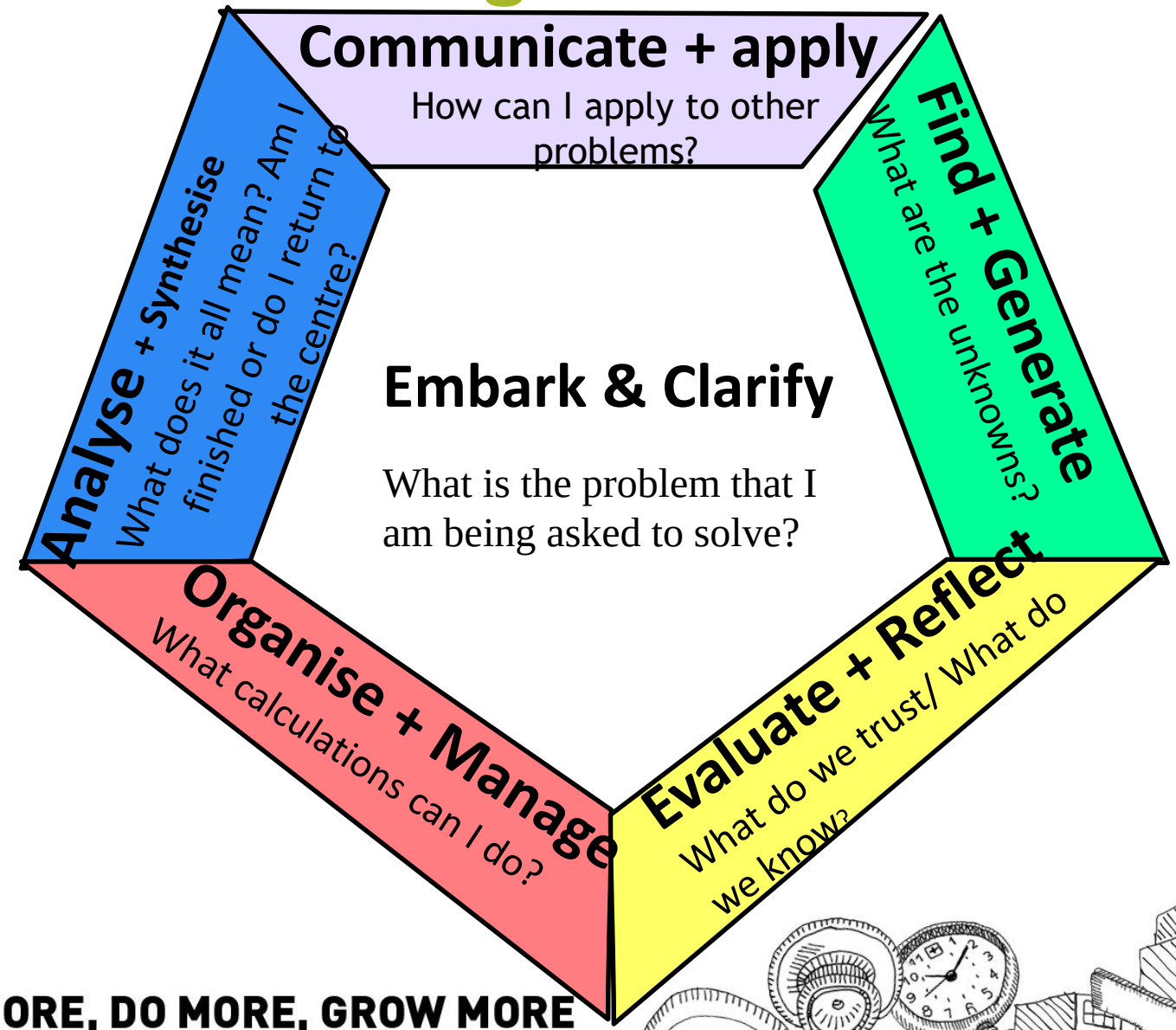
Optimising problem solving pentagon

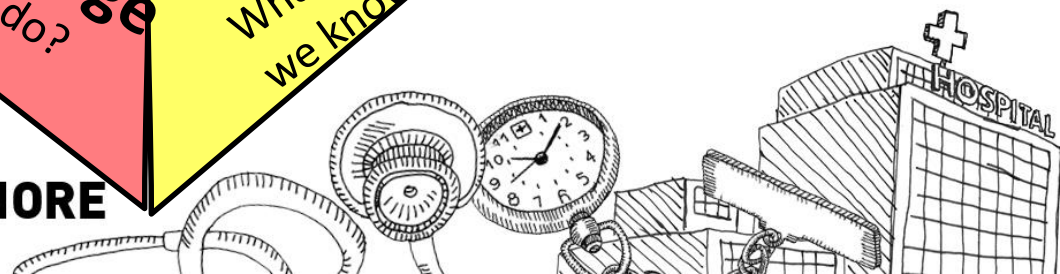


LEARN MORE, DO MORE, GROW MORE



Keep Calm Pentagon





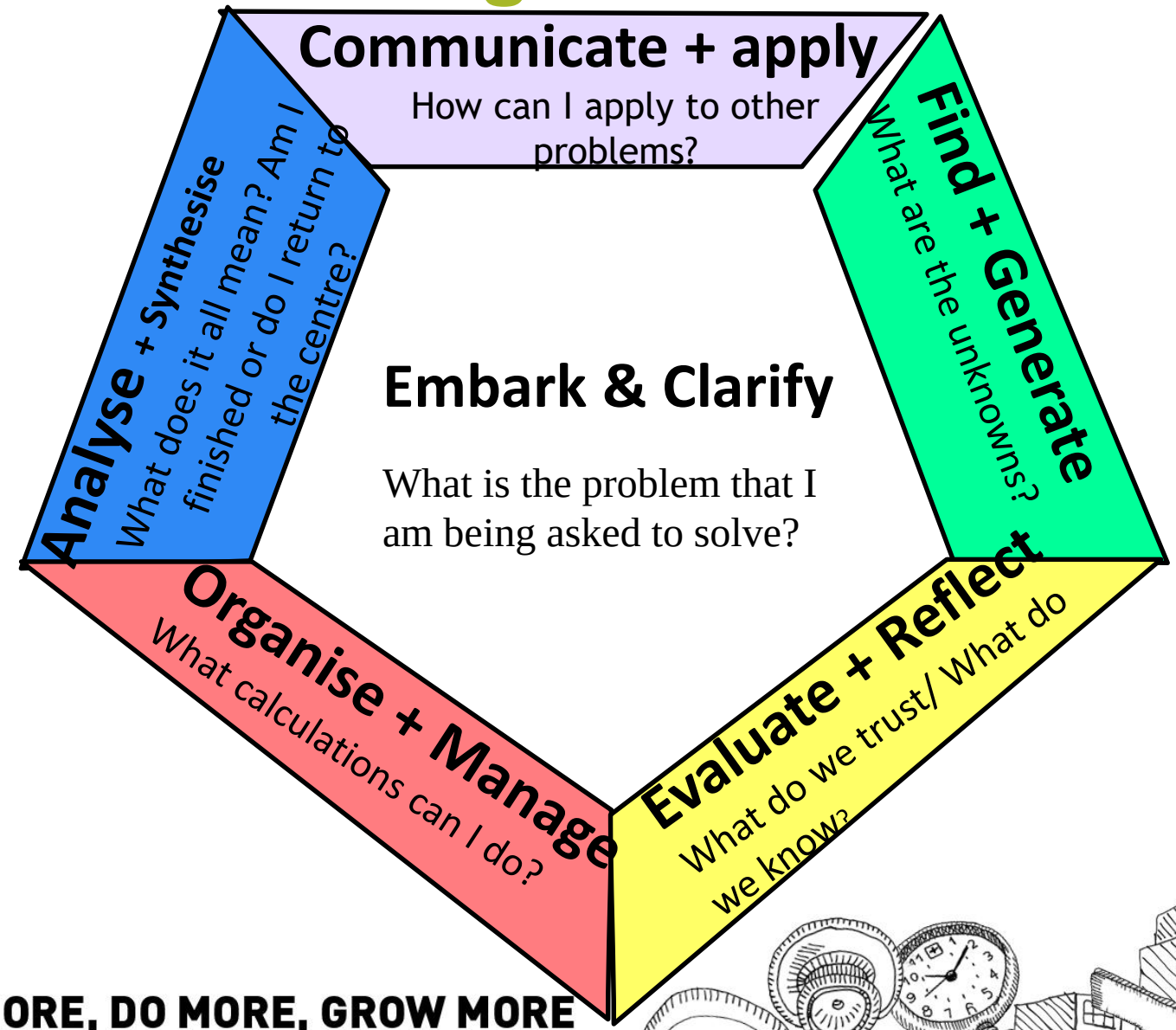
LEARN MORE, DO MORE, GROW MORE

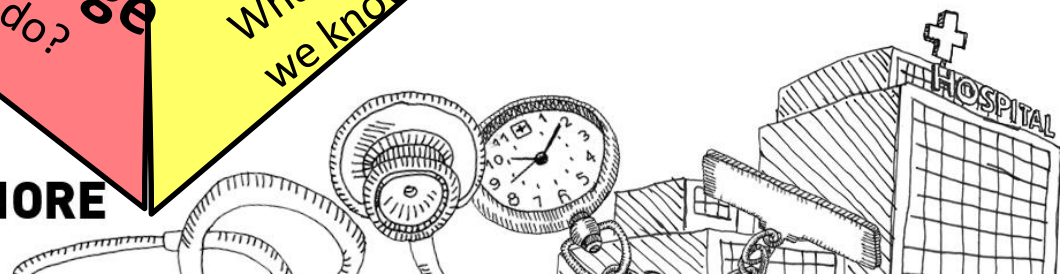
Problem 1

A builder's tandem trailer can carry 1.5 tonnes.

The builder requires 75 bags of cement for the bricklayers. How many bags can be transported on the builder's tandem trailer at one time, if each cement bag has a mass of 40kg?

Keep Calm Pentagon



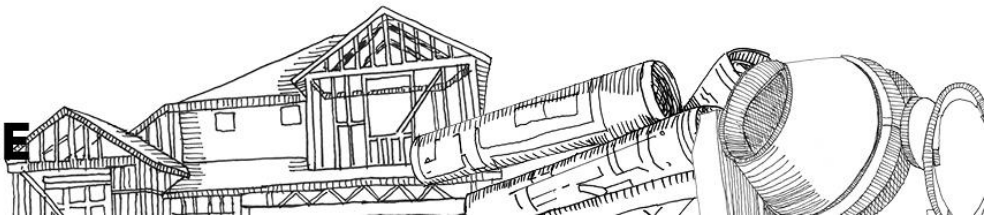


LEARN MORE, DO MORE, GROW MORE

Embark and clarify

What is the question?

- How many bags of cement will fit on the trailer at any one time?

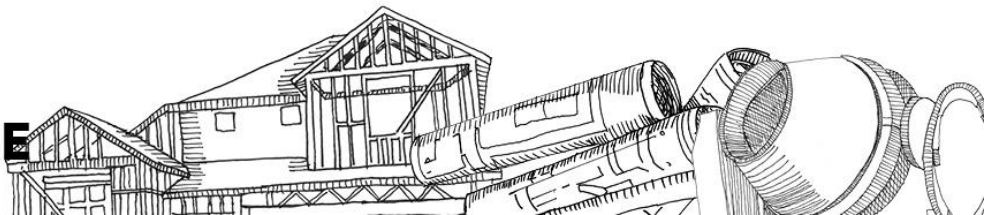



Find and generate

Problem 1

Sometimes we can't do much with this step until we know the next step.

Think about what we do not yet know, that we need to find out to solve the problem.




Evaluate and reflect

We know

- Trailer capacity $= 1.5\ tonnes$

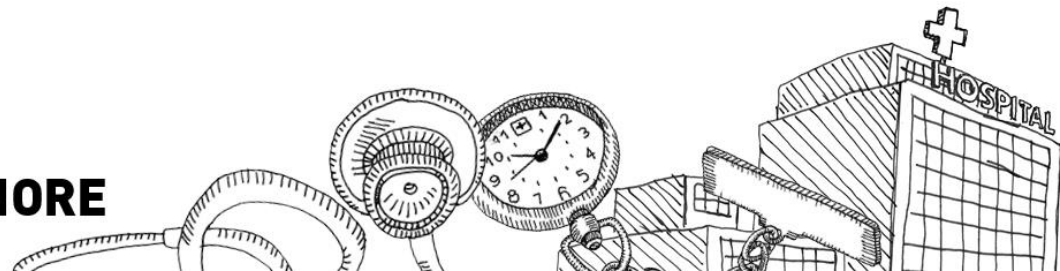
How to convert from tonnes to kilograms

$$1\ tonne = 1{,}000\ kg$$

How much a bag of cement weighs

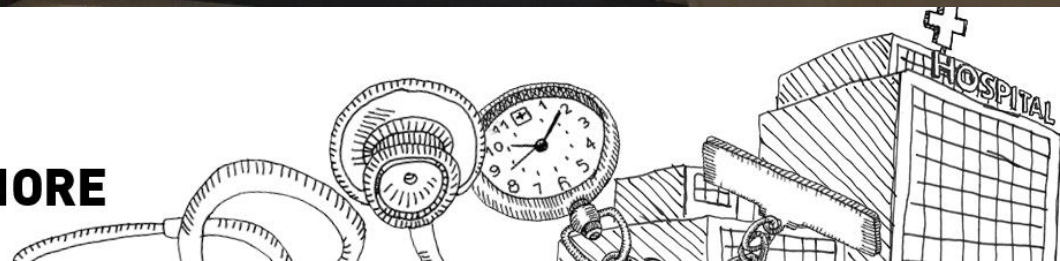
$$1\ bag\ of\ cement = 40kg$$

Note: we are not doing any calculations yet. We are simply looking at what we know that will help us.



Organise and manage

LEARN MORE, DO MORE, GROW MORE



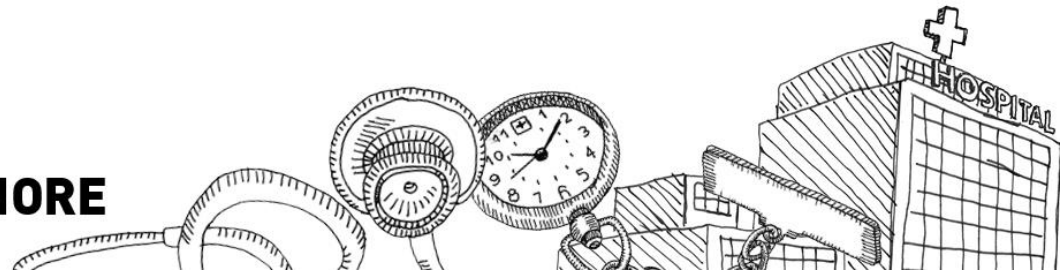
Calculations

Convert trailer capacity to kg:

$$1.5 \text{ tonnes} = 1.5 \text{ x } 1000kg$$
$$= 1500kg$$

Answer: Max $number\ of\ bags =$

$$1500kg \div 40kg$$
$$= 37.5\ bags$$



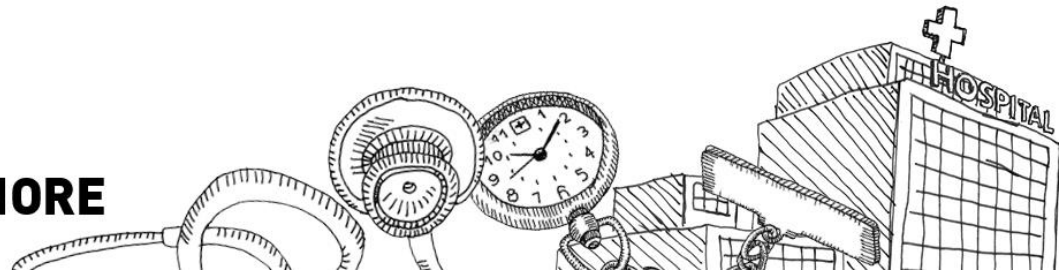
Analyse and synthesise

Problem 1

We have said that the builder can carry 37.5 bags of cement at one time.

Would the builder carry part of a bag of cement?

Return to the centre – step one, Embark and clarify



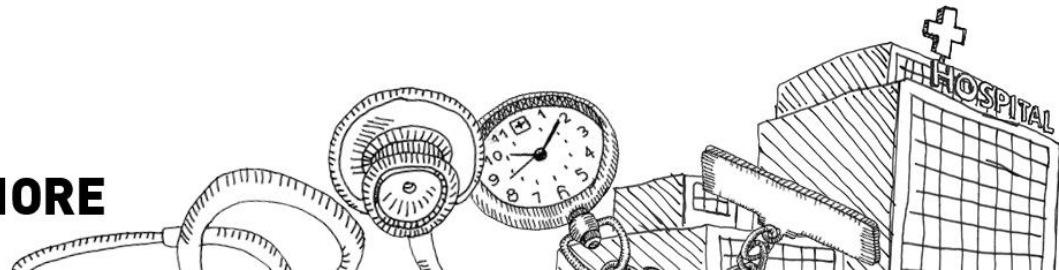
Problem 1 Embark and clarify

We are asked for the number of bags that can be transported in one trip.

We can assume that this means *whole* bags.

Find and generate

We do not know how many whole bags can be transported in one trip

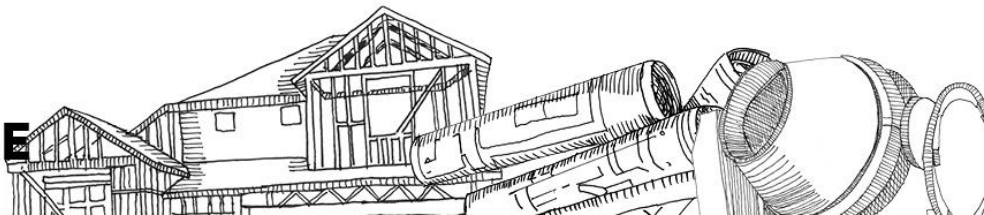


Problem 1 Evaluate and reflect

We know that 37.5 bags can be carried.

- It does not make sense to round this up to 38 whole bags as this would make the trailer carry over it's capacity.

- So the maximum number of whole bags that can be transported in one trip is 37.



Analyse and synthesise


Communicate and apply
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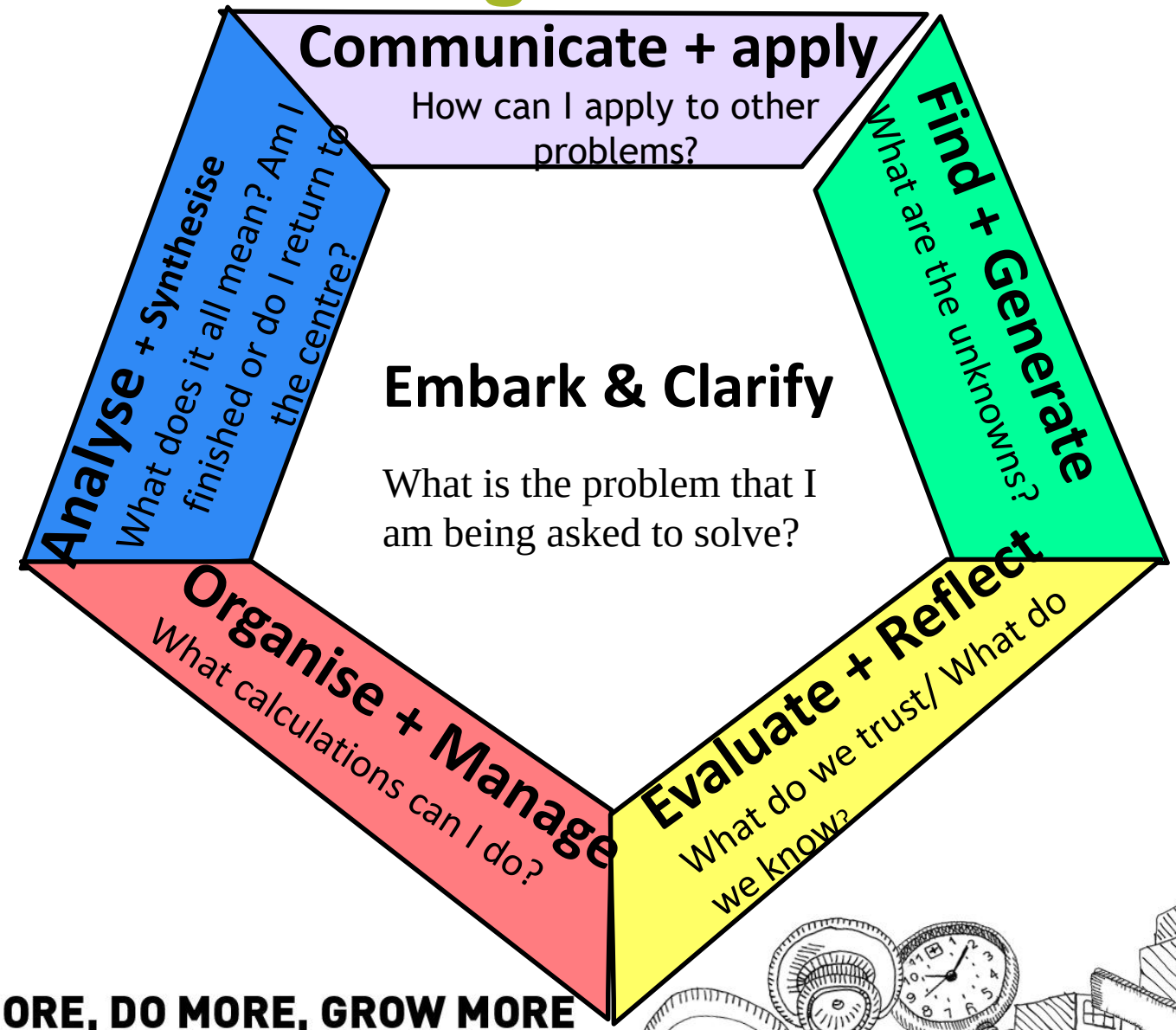
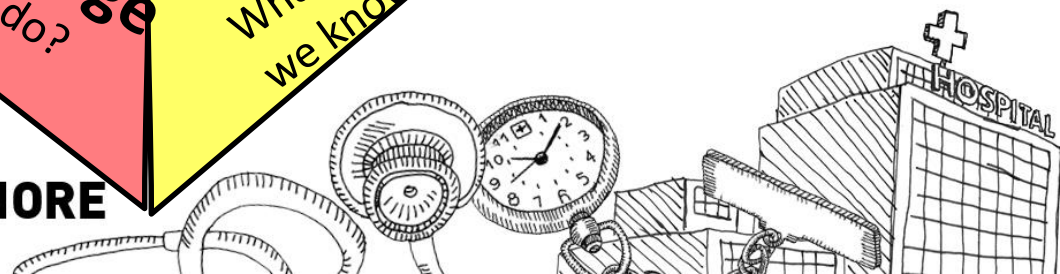
Problem 2

Warfarin is available in 1mg, 2mg or 5mg tablets. If you are to only give a patient whole tablets, what combination is required for a 14mg dose?

Keep Calm Pentagon





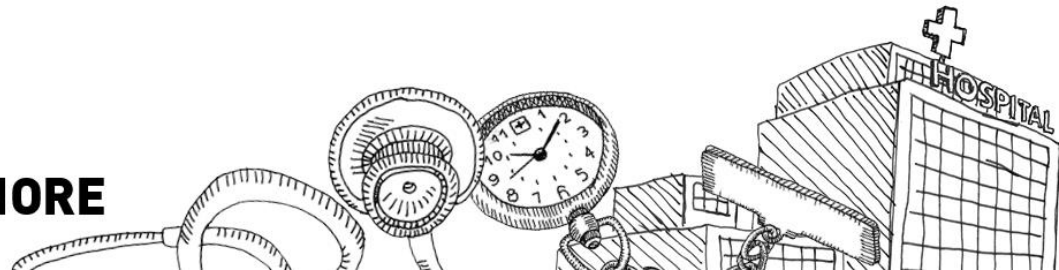
LEARN MORE, DO MORE, GROW MORE

Embark and clarify

Problem 2

What is the question?

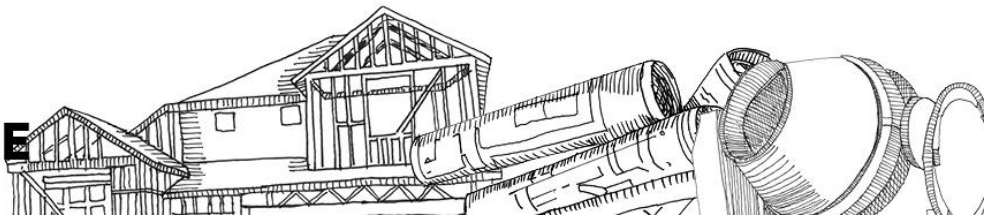
- How many whole tablets of 1mg, 2mg and or 5 mg does the patient need?




Find and generate

Problem 2

- Don't do calculations yet. Just ask questions.
- We do not yet know how 14 mg can be broken down into a combination of whole tablets of 1, 2 and or 5 mg.

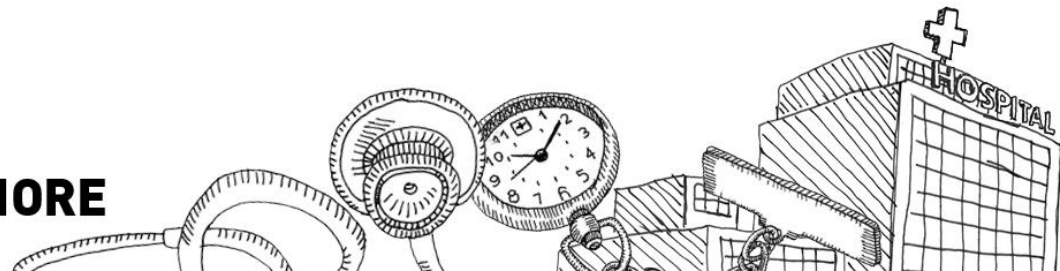


Evaluate and reflect

Problem 2

- $14 = 7 + 7$ *or*
- $14 = 5 + 5 + 2 + 2$ *or*
- $14 = 2 + 2 + 2 + 2 + 2 + 2 + 2$ *or*
- $14 = 5 + 5 + 1 + 1 + 1 + 1$

- ,
- We just need to end up with a combination of 5, 2 and 1.

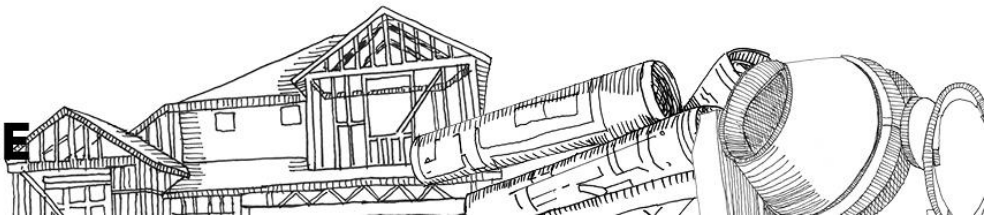


Analyse and synthesise

Problem 2

- What makes sense for the patient?
- The patient may prefer to take the least number of tablets. If we give the patient 14 tablets of 1mg, or 7 tablets of 2mg, the dose would be correct. But the patient may not be very happy.
- The preferred option would be to give

2 tablets of 5mg and 2 tablets of 2mg.




Communicate and apply
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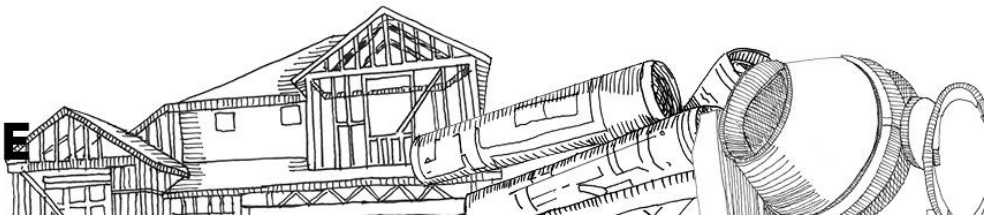
Purpose of the Keep Calm Pentagon

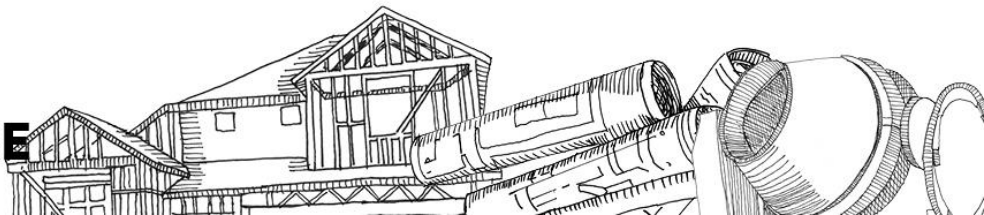
- Students initially write the steps of the pentagon in their own words.
- After practicing several times, the extra detail which they may need initially to help them with the steps will not be required.
- The calculations and steps involved will make sense, leading to confidence.
- Familiarity from repeated practice gives experience and understanding, leading to competence.



Analyse and synthesise

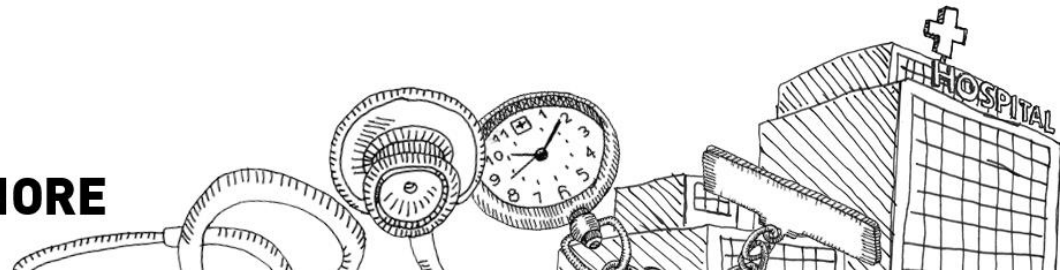
Keep Calm Pentagon project

- Is it easy to learn
  - for teachers?
  - for students?
- Can it be adapted to different contexts?



Communicate and apply

How would you use the pentagon in your context?



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Thank you