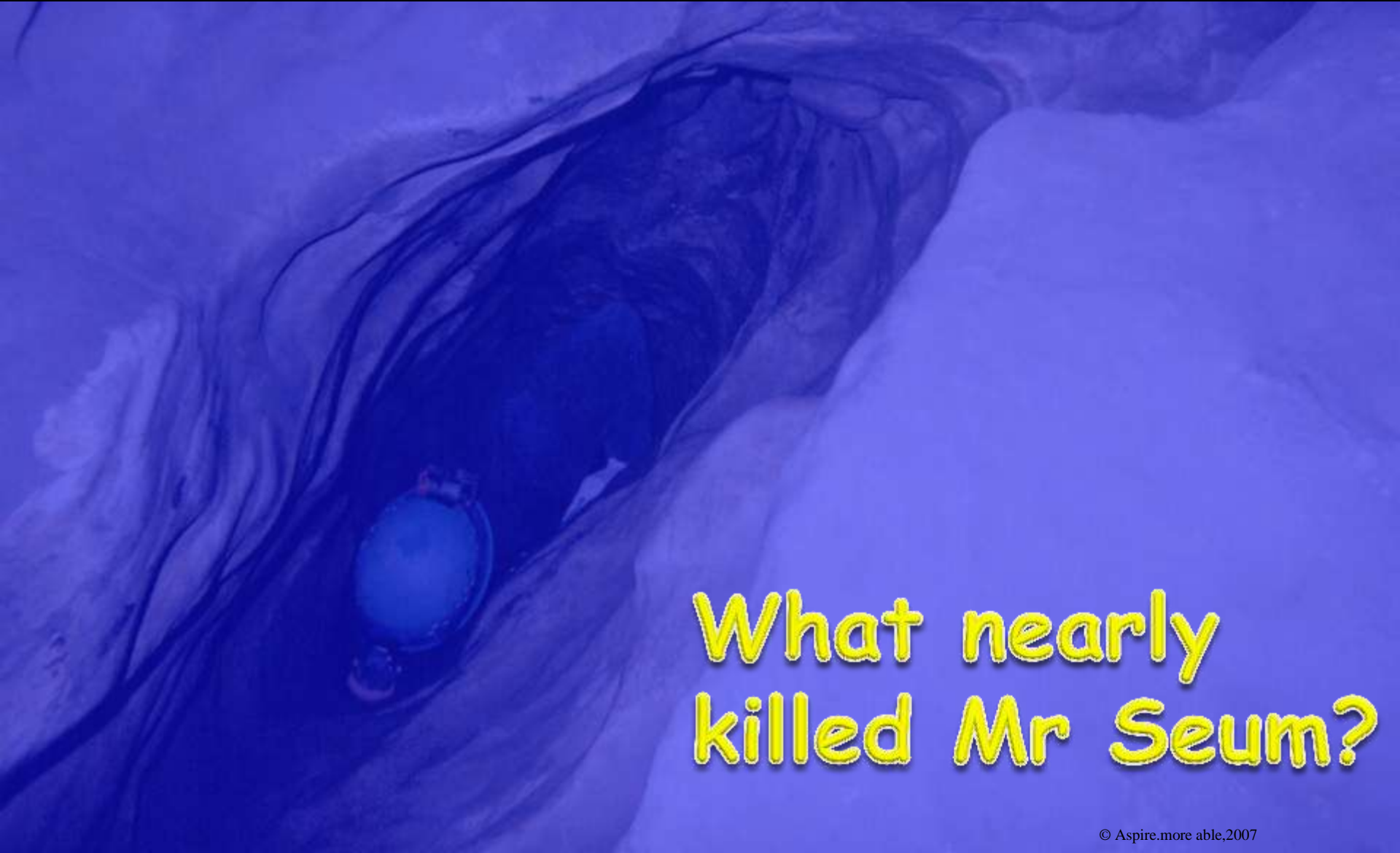


# Caving Conundrum



What nearly  
killed Mr Seum?

Mr Seum described his experience in his classroom, challenging pupils to decipher the clues and investigate possible causes for his symptoms in the cave.

You have to complete the same challenge....

Highlight all the words/phrases in the newsletter you would research or type into a search engine to deduce what happened

There are lots of different clues on the front page.  
How many can you find?

# CAVING CORNERSTONE

## **Related News – At A Glance:**

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**1998**

- Teacher survives a terrifying ordeal looking for stalagmites in Yorkshire
- High Expectations for the Gothenburg Protocol to clean up Britain's image
- Evidence suggests our health is suffering as much as the environment.
- A stalactite in the shape of a giant gorilla is found.

# WARNING: A stench of Foul Air in the DALES

Ace chemistry teacher, novice caver, was lucky to escape with his life in a near tragic misadventure. His ideas to explain the danger may rock the caving world!

As all experienced cavers are aware, exploring unmapped caves alone breaks the caving code - especially when the geographical location is unfamiliar.

Calvin Seum, 34, holidaying from Sweden, ventured into the innocent looking cavern in search of Stalagmites to photograph for one of his lessons. But the descent was surprisingly abrupt and he quickly found himself in over his head.

"The entrance was tiny and wet with rainwater but I crawled downward until the ground became dry and powdery. Then there was a sheer drop into a pit - maybe 10 feet deep - I needed ropes it was so steep. As I tried to climb up to a high ledge on the other side I noticed a dry acidic taste in my mouth."

"I was giddy with the excitement of discovering a new cave but then I started

actually feeling dizzy, finding it hard to keep my balance. I knew I was in trouble. Had I not managed to scramble back to the entrance, I may well have died down there. But, I've got a great story to tell and my own theory to explain the danger"

His ideas have grabbed our attention and - just like the cave - we are reacting! We have dedicated this issue to explore Cal's ideas further - to highlight a possible new source of danger for cavers.

However, we at *Cavers Cornerstone* cannot condone the recklessness of the man to go it alone! It could so easily have been a different story. If his theories prove to be correct, it seems ironic that the man from southern Sweden is nearly killed by the same phenomenon that make Swedish lakes so vivid and beautifully blue in colour.

## Our Trees Defoliated - Our Lakes at Risk!

Latest research suggests that a staggering 22% of trees in the UK have been damaged by Acid Deposition.

Data shows that our trees are less densely foliated than they were twenty years ago. The effects on our ecosystems could be devastating, as seen in the Scandinavian lakes.

“This is just one symptom of the way our energy-hungry modern world impacts on the

environment! It has been predicted for years that this could happen. It is embarrassing to realise that the Scandinavians were right to call the UK the ‘Dirty Old Man Of Europe’. The figures are shameful.” A spokesperson from DEFRA said.

The shocking data and worrying consequences are revealed inside this issue.

Mr Seum may be right!

### Inside this issue:

Calvin Seum investigates!	2
Defoliation across Europe	3
Coal Power Stations to Blame	5
Thirty Percent Club Update	6
Alarming Health Related Issues	6
Liming – an Answer for Lakes?	7
Limestone Architecture Eroding	8

**You must investigate and offer scientific explanations that solve the mysteries:**

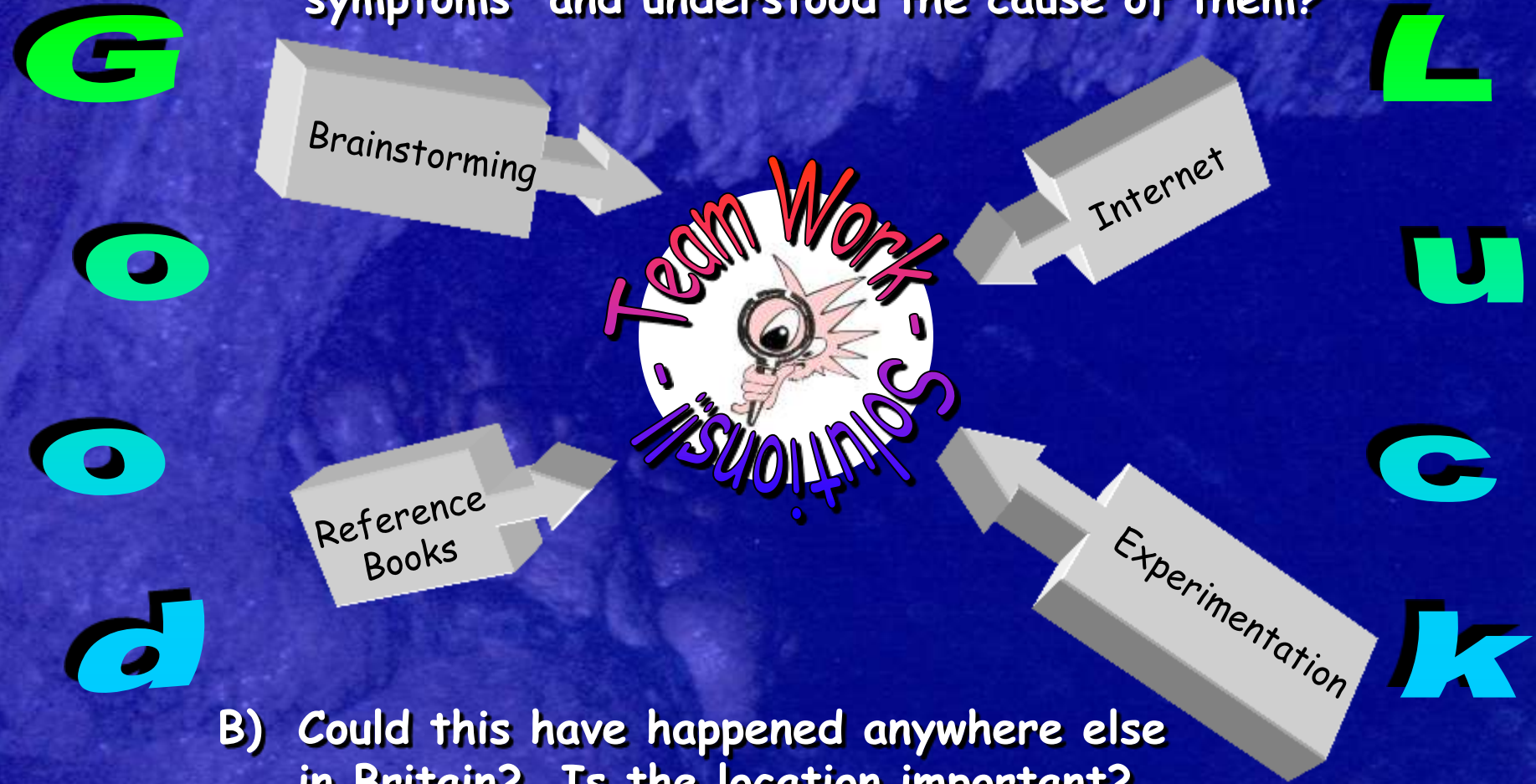
- 1) 'What was the danger?'
- 2) 'How was it caused?'



- **Include any relevant Chemical equations**
- **Identify the clues and explain how they helped**

# General Hints:

- A) Would an experienced cover have recognised the symptoms and understood the cause of them?



- B) Could this have happened anywhere else in Britain? Is the location important?

- C) How many different explanations exist? Which one is most likely?

# Practical Investigations

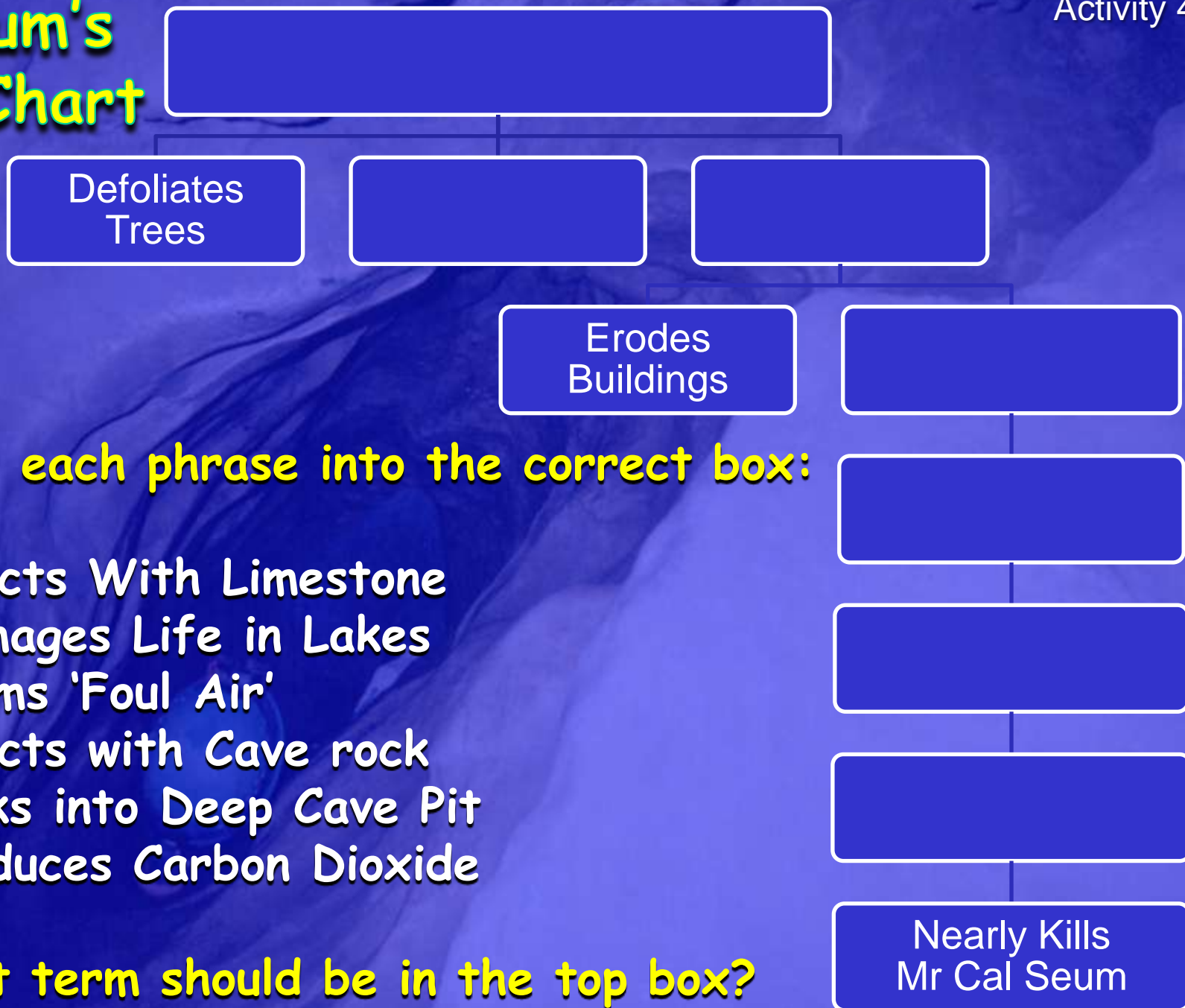
- 1) Place 2ml of 'rainwater' and 2 drops of indicator into a test tube. Note the colour.
- 2) Add a rock sample taken from inside the cave.
- 3) Describe your observations.
- 4) Decide how to collect and test any gases produced.
- 5) Repeat this process with the other rock samples.

**Repeat these tests using the water found inside the cave *and control samples***

**Write down your conclusions.**



# Mr Seum's Logic Chart

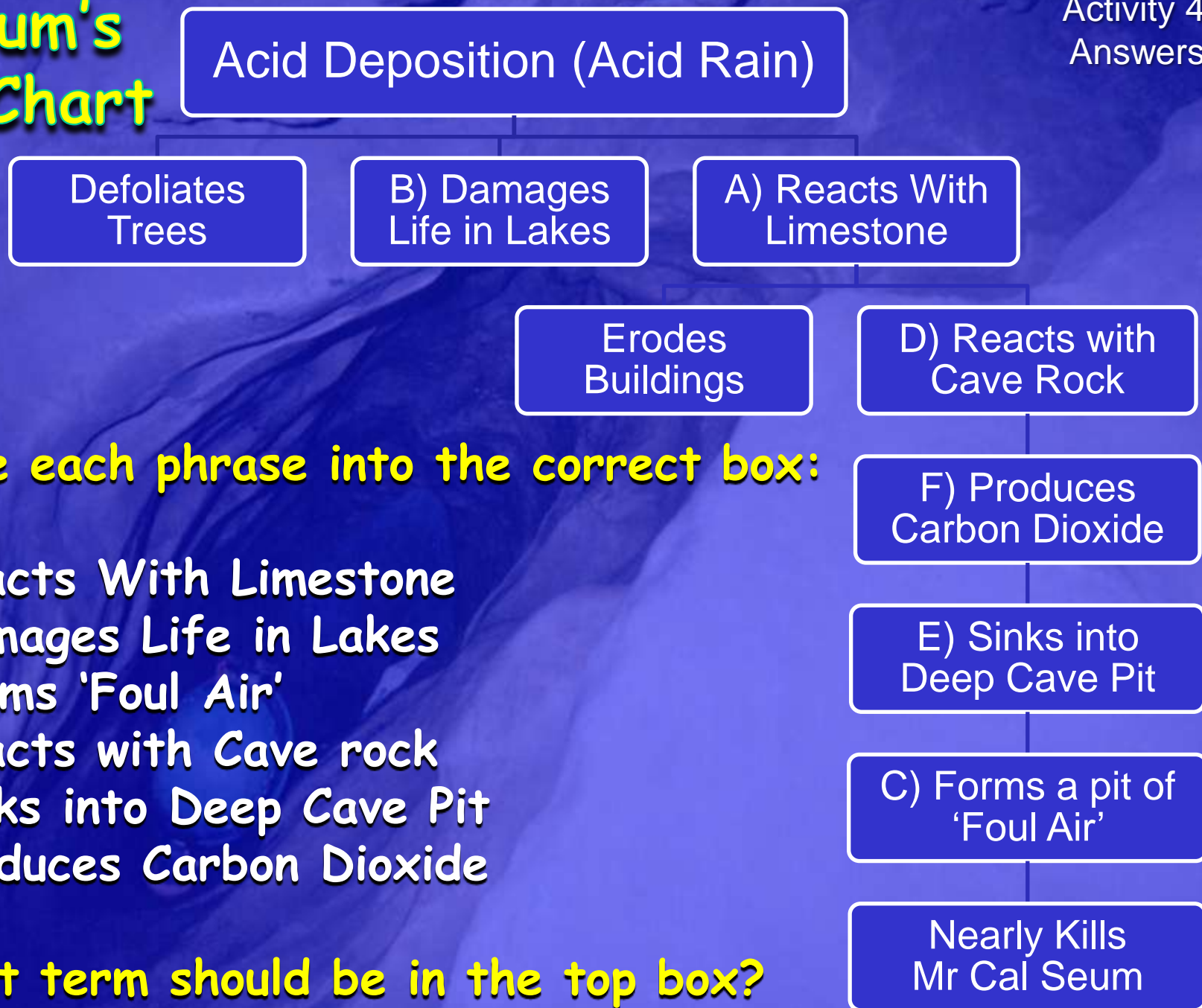


1) Place each phrase into the correct box:

- A. Reacts With Limestone
- B. Damages Life in Lakes
- C. Forms 'Foul Air'
- D. Reacts with Cave rock
- E. Sinks into Deep Cave Pit
- F. Produces Carbon Dioxide

2) What term should be in the top box?

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# Deeper Investigations



Could a reaction between Acid Rain and a Limestone cave produce enough  $\text{CO}_2$  to fill the pit and create Foul Air?

Hints:

Take enough measurements to allow you to graph your results.

Design reliable 'fair tests'



You may use Hydrochloric Acid (HCl) instead of Sulphuric Acid in lab tests

- 1) Measure how different concentrations of acid affect the rate of reaction.

*How does the reaction of the rainwater found at the site compare to the reactions conducted in the lab?*

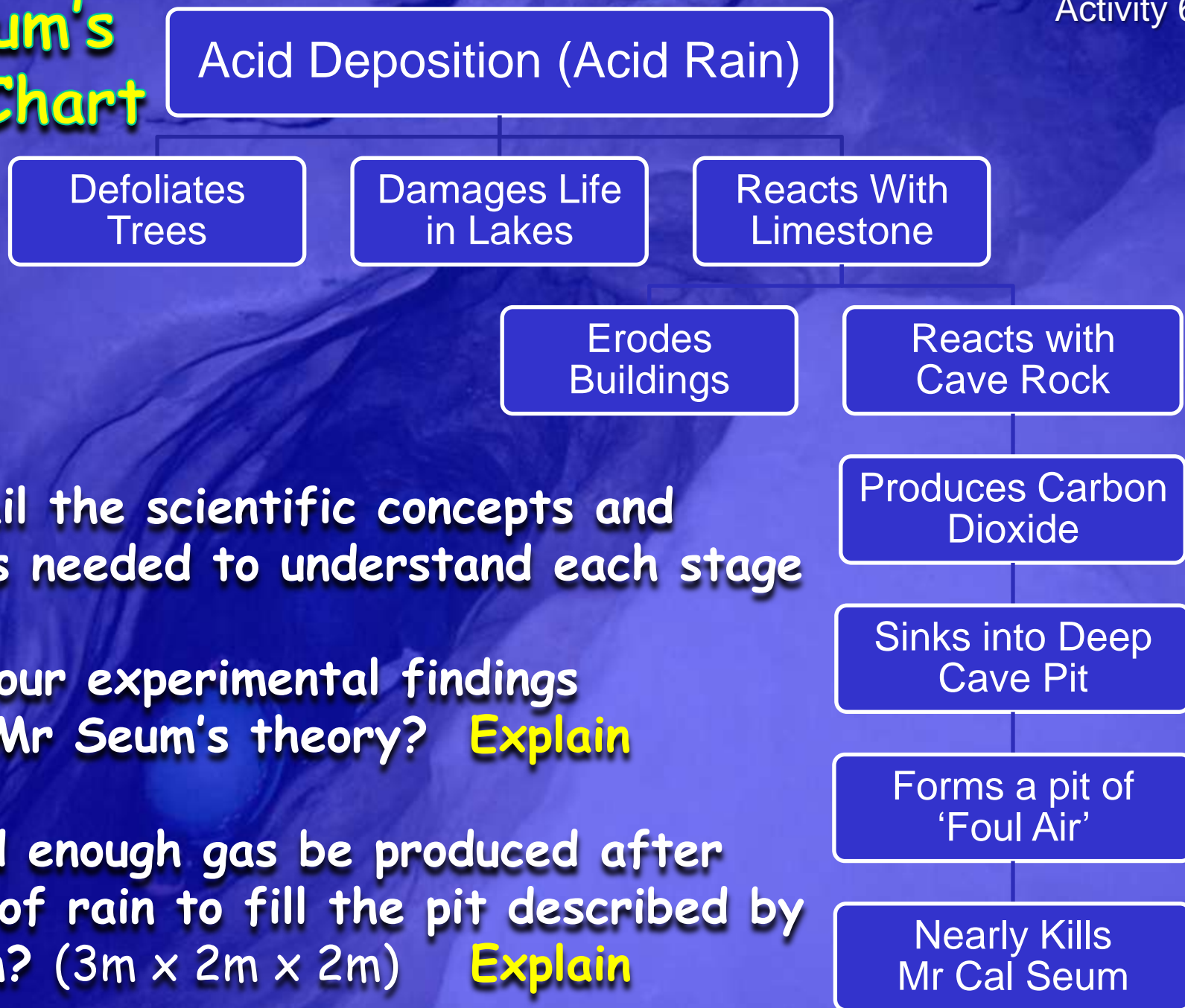
- 2) Measure how different surface areas of rock affect the rate of reaction.

*The rock surface was described as powdery. How much difference does it make?*



**Choose one factor to investigate in detail**

# Mr Seum's Logic Chart



**A)** Detail the scientific concepts and equations needed to understand each stage

**B)** Do your experimental findings support Mr Seum's theory? **Explain**

**C)** Could enough gas be produced after one day of rain to fill the pit described by Mr Seum? (3m x 2m x 2m) **Explain**