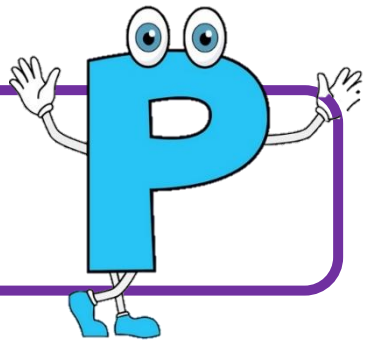
The James Hutton Institute



Plants in need, need Phosphorus indeed!

The P Game! Get enough P to the plant to help it grow!

What you'll need to play:

Scissors (to cut up tiles)

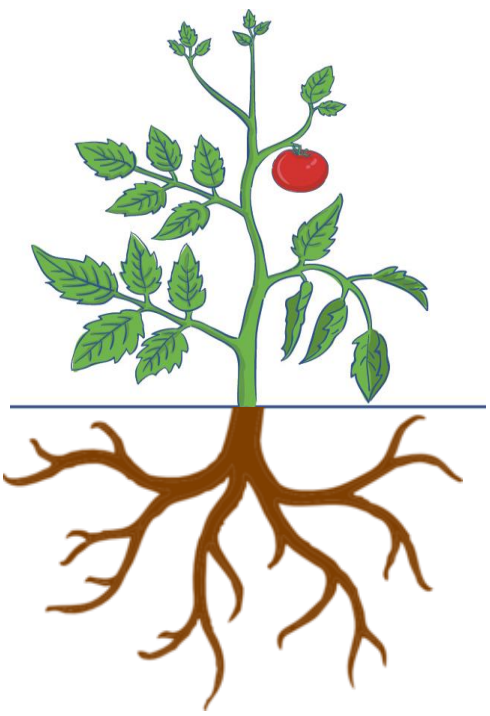
1p

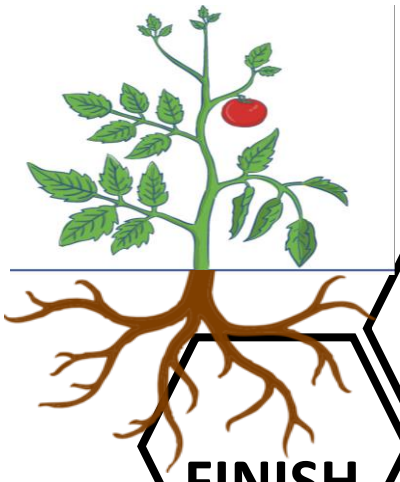
1 pence per player

Game Instructions:

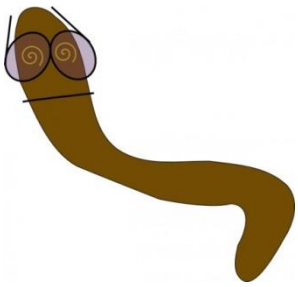
This plant needs 10 milligrams of P to grow. Can you help it get enough P to grow?

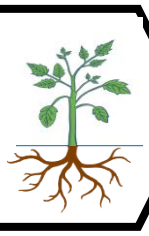
1. Cut up the tiles in the back of your book
2. Put all of the cards face down
3. When it's your go, turn over a tile to see what the soil gave you
4. The characters will tell you how many milligrams of P you get with each turn. Each space on the board is 1 milligram
5. Taking turns, move your P forward or backward on the board
6. The first player to reach the roots of your plant wins!

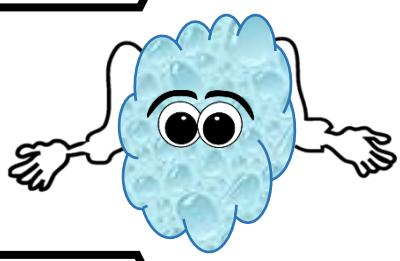


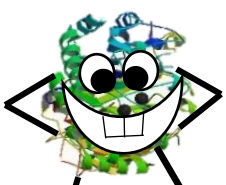


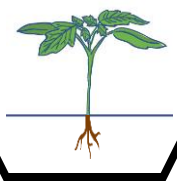
FINISH



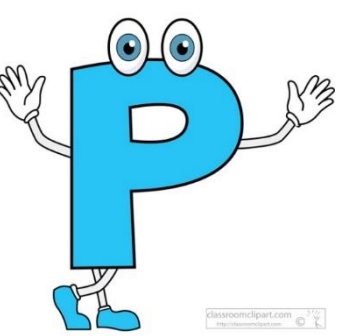




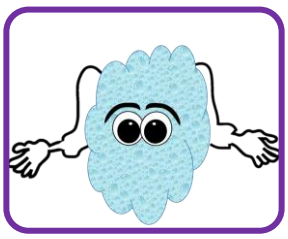




START



Plants in need, need Phosphorus indeed! What a plant needs to access P.



Wally 'all washed up' Water

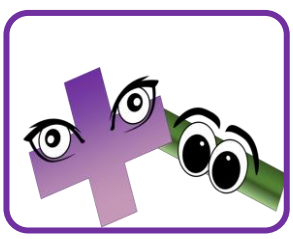
- Soil water can allow P to travel through the soil to the plant
- Your plant just got 1 milligram of P, move on 1 space

Hairy the Root

- Hairy roots help your plant explore more of the soil and take up more of the nutrients!
- An amazing 4 milligrams of P! Move on 4 spaces

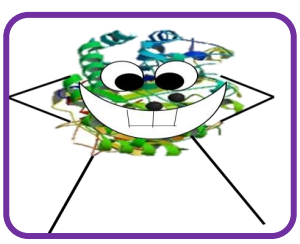
Sticky Soil Sally

- Soil particles can be very sticky, attract P and lock it away from plants
- 2 milligrams of P has become stuck to soil, move backwards 2 spaces



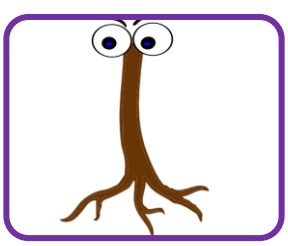
Andy & Caty Ion

- Ions can help Enzo unlock P from soil minerals and release P from Sticky Soil Sally
- Move on 2 spaces



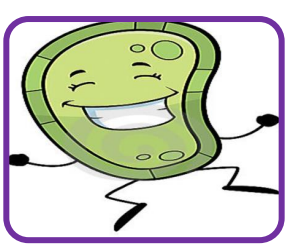
Enzo the Enzyme

- Enzymes help turn P into forms that a plant can use and Enzo releases 3 milligrams of P, move on 3 spaces
- If you also have Andy and Caty Ion, they give Enzo an extra boost and an extra 2 milligrams of P is released and you can move a total of 5 spaces!



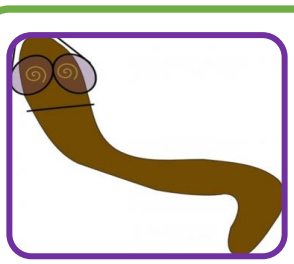
Donald the Deep Root

- Deep roots reach too far beyond where the soil P is and do not always help the plant to gain more P
- 2 milligrams of P lost from plants with very deep roots
- Move back 2 spaces



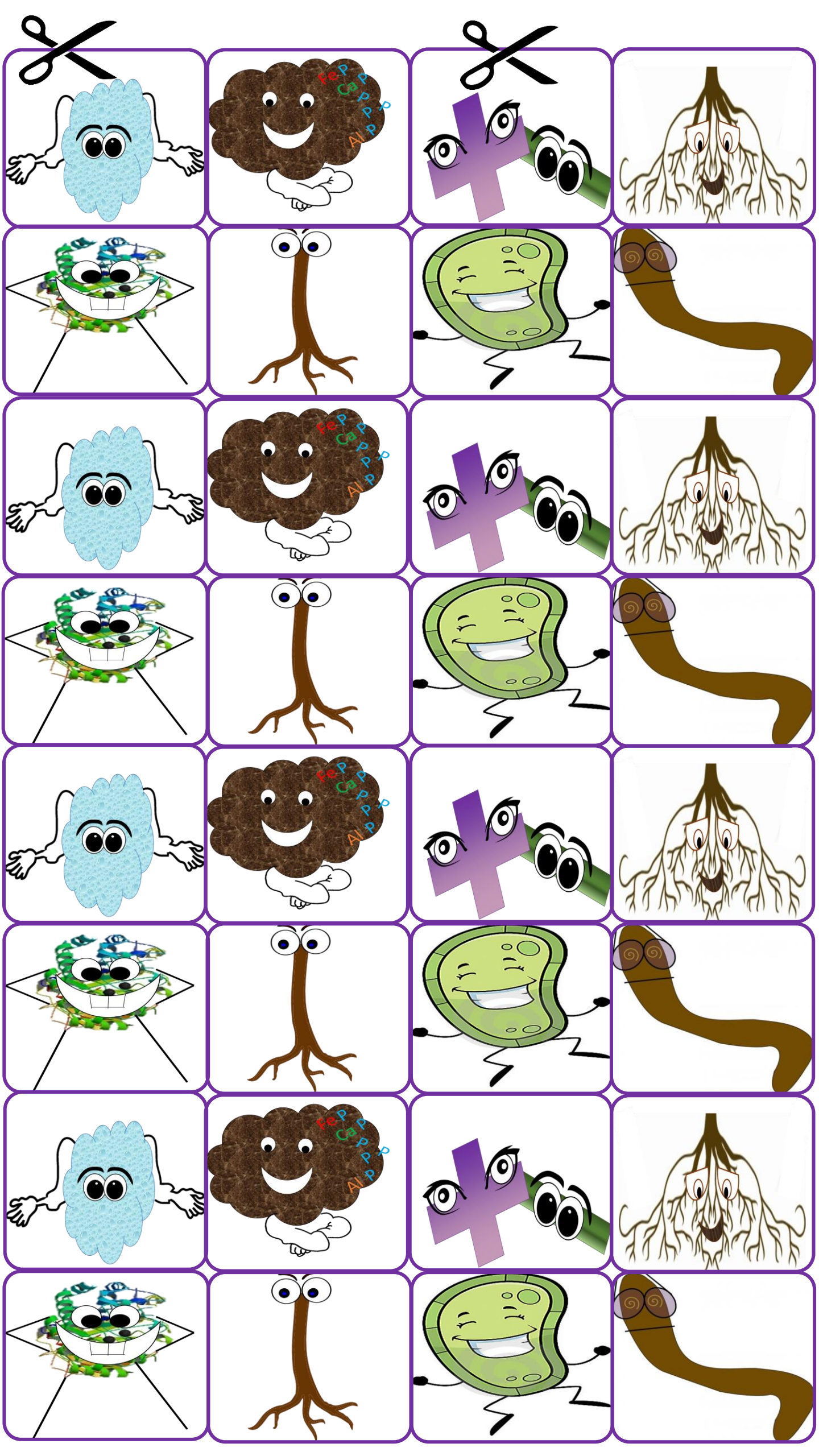
Barry Good Bacteria

- Bacteria can help turn P into forms that a plant can use but can also hold onto P and not share
- Move forward 1 space



Nematode Neilson

- Nematodes can help release the P that bacteria won't share (by eating them!)
- You cannot move with just Nematode Neilson but if you also have Barry Good Bacteria, move forward 4 spaces!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P
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