Framework Biology 4

An Inquiry Based Science Teaching and Learning Framework

Discover SENSORS

Biology B4

Topic/Learning Activity

Investigating the conditions necessary for germination. OB57/OB58

Student Cohort

Student Level
First Years mixed ability

Prior Knowledge
Students will have studied plant structure, pollination and fertilisation.

Stimulus to Engage

Each pair of students received some dry broad beans and some germinating broad beans

Students will watch a short clip on germination at any of these YouTube URLs
http://www.youtube.com/watch?v=rDN0yAFcQok
http://www.youtube.com/watch?v=d26AhcKeEbE&NR=1
http://www.youtube.com/watch?v=iFCdAgeMGOA&feature=related

Each pair of students received a dry broad bean and a germinating broad bean

Science Questions

- What is the difference between the two seeds you have in front of you?
- To check prior knowledge, discuss with class. Have you sown seeds? What time of the year did you sow them and why? What did those seeds need to grow?

Learning Outcomes

Content Knowledge

- The student will be able to list the conditions necessary for germination, and explain what germination means

Process

- The student will be able to research and plan the investigation, and understand how to make it a fair test

Skills

- The student will be able to work with others and communicate effectively

Questions during Activity

Questions to drive student learning (directing them to the learning outcomes):

- How are you going to set up a situation so that your seeds will germinate better then any other group's?
- How do you keep it a fair test?

Questions to probe understanding:

- Why might be the reason that some seeds to do germinate as well as others?
- Why do seeds in packets on the shop shelf not germinate?

Questions to get students thinking about their own learning (metacognition):

- Write a "3 Do's and 3 Don'ts" caption that a gardening program could use to advise it's viewers
- Try to get them to link between this section and Human Nutrition

Developing the Activity

How do you stimulate students to ask even more questions/think further?

- Are all seeds affected by these conditions? (Have a variety of seeds on offer)
- Is there any other condition that affects the germination of seeds?
- Make a list of foods that we eat that are either full seeds or made from ground seeds
- Why do we eat seeds?
- Brainstorm the names of as many oils as the students can think of – olive, sunflower, almond, coconut etc., What are so many cooking oils made from seeds? Try to get the connection between nutrition for the growing seeds (fats) that we interrupt to eat ourselves!

Possible supporting activities:

- Do all seeds germinate in the same way?
- Find out what's inside the seed (let them do an iodine drop test)
- Germination and respiration. **See Activity for Biology 4**

Questions for supporting activities:

- Research - What is the fastest growing seed...the largest seed...the smallest...etc
- What are the biggest seed crops in the world?

Reflecting back to Learning Outcomes

- How many of your intended outcomes were achieved?
- Do any of your intended outcomes need to be revised?

Additional Resources

Stimulus materials, websites, etc.:

Various clips re germination from YouTube

Keep a collection of a variety of seeds in the lab – invite students to add to it over their time with you.

How has the use of ICT enhanced the learning?

Evidence of enhancement:

Temp /oxygen probes may be used as meters during germination activity

Datalogging software could be used to produce graphs from collected data (no. Of seeds sprouted etc)

Webcam could be used to take time lapse pictures, students could make small presentation using these images (Photostory, MovieMaker, PowerPoint).

Additional Comments