Subject: Science

Level: Standard 4

Strand:Individuals and Groups

Topic: To investigate the physical changes in plant growth during germination

Key Points:

- The growth of a seedlingfrom a seed is called germination.
- For the seedling to germinate, the seed needs the right amount of light, warmth and water.
- The growing seedling also uses food which is stored in the seed.
- Germination takes place in stages.
- Once it is provided with the right conditions, a seedling will continue to grow and produce a mature/adult plant
- The adult plant will produce seeds which can germinate to produce seedlings
- Germination is part of the life cycle of a plant.

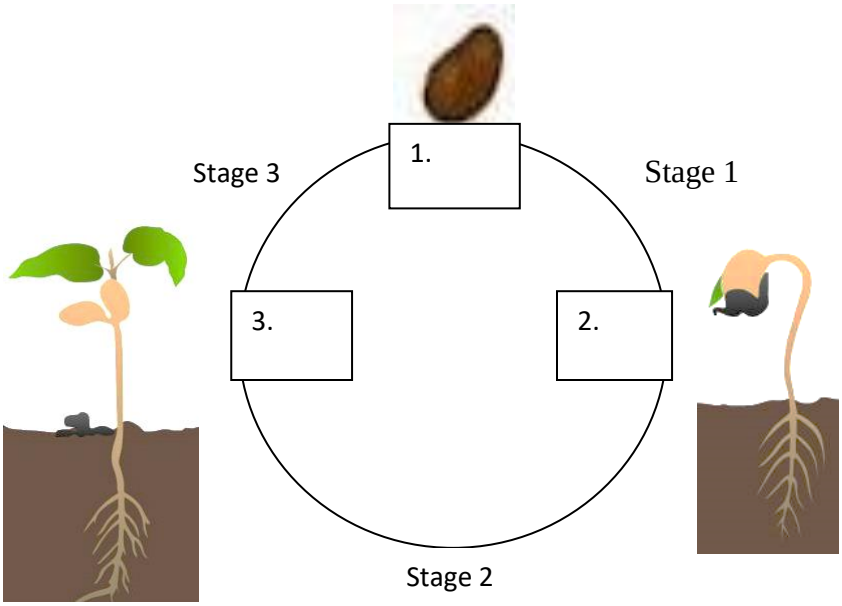
Activity

1. Life cycle of a plant such as red bean

An adult plant produces seeds which germinate to form seedlings. These seedlings grow into adult plants.

(i) Use the following words to label boxes 1, 2 and 3 in the diagram of the life cycle below:

seed **seedling** **adult plant**



(ii). At which stage does germination take place?

_____

2. Germinating the seeds

A student conducted an experiment to investigate the germination of red bean seeds into seedlings. The student germinated his red bean seeds in a jar, as shown below:

To germinate the seeds, the student did the following:

- Five red bean seeds were covered with tap water and soaked in a jar for 12 hours.
- Tissue was moistened and placed along the sides of another jar, similar to the picture.
- The red bean seeds were removed from the water and placed between the side of this jar and the tissue.
- Water was added to cover the bottom of the jar. This is to keep the tissue moist.
- The jar was placed on a cupboard and kept in the light, at room temperature.
- The seeds were observed for seven days.

In the table below, make a list of all the items which were used for this investigation.

Items used to observe germination

3. Observing Germination

The student observed the red beans each day and recorded the changes. A picture of the daily changes during germination, is shown below.

Use the table below to match each of the following statements to the growth of the seedling on that day.

- The shoot continues to grow. The root also grows longer. Leaves are open and larger.
- The shoot with tiny closed leaves continues to grow. The root also grows longer
- The shoot continues to grow. The root also grows longer. Leaves begin to open.
- The root of the baby plant begins to grow.
- The shoot with tiny closed leaves develops
- The seed take in water and swells.
- The shoot continues to grow. The root also grows longer. Leaves are open.
- A tiny root grows downwards whereas a shoot begins to grow upwards.

Day	**Growth of seedling**
1	
2	
3	
4	
5	
6	
7	
8	

Assessment

4. (i) Do you think the seedling will be able to grow into a tree if it was left in the jar?

_____

(ii) What more will it need to be able to survive?

_____

_____

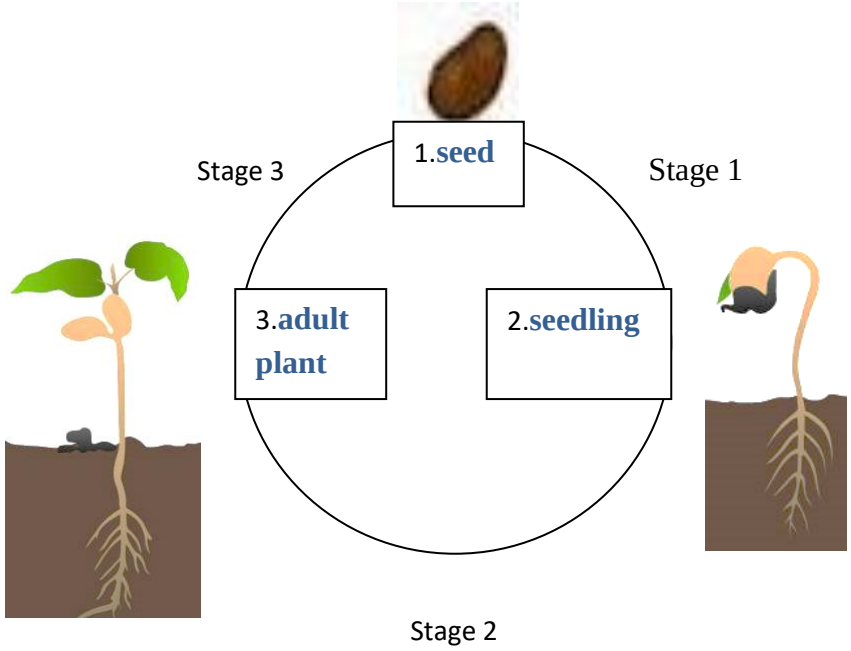
(iii) What changes will there be in the seedling, as it becomes an adult plant?

_____

_____

Answer Key

1 (i)



(ii) Germination takes place at **Stage 1.**

2.

Items used to observe germination
Five red bean seeds
Tap water
Clock
Jar for soaking red bean seeds
Jar for germinating red bean seeds
Tissue

3.

Day	Growth of seedling
1	**The seed take in water and swells.**
2	**The root of the baby plant begins to grow.**
3	**A tiny root grows downwards whereas a shoot begins to grow upwards.**
4	**The shoot with tiny closed leaves develops**
5	**The shoot with tiny closed leaves continues to grow. The root also grows longer**
6	**The shoot continues to grow. The root also grows longer. Leaves begin to open.**
7	**The shoot continues to grow. The root also grows longer. Leaves are open.**
8	**The shoot continues to grow. The root also grows longer. Leaves are open and larger.**

4. (i) **No, the seedling will not be able to grow into a tree if it was left in the jar.**

(ii) **To be able to survive, it needs nutrients and more water from the soil. The shoot will continue using sunlight and air.**

(iii) **As the seedling becomes an adult plant, the root and shoot will become longer and thicker. Also, the leaves will increase in size and number.**

Acknowledgement

Activity with Picture	**Reference**
1. Life cycle of a plant such as red bean	https://slidemodel.com/templates/seed-germination-growth-powerpoint-template/
2. Germinating the seeds	https://childsci.org/bean-in-a-jar/ Beans in a Jar – Children's Science Center childsci.org
3. Observing Germination	https://easyscienceforkids.com/all-about-germination/