



Grades 1 - 3 Bean in a Bag

TEACHER RESOURCES

Watching a sprout emerge from a dry seed close up can be amazing. Plant a bean in a plastic bag to watch roots form and leaves emerge before your very eyes.

This activity uses simple at-hand materials and goes well with the “Plant Parts” lesson.



Greenplanet Energy Analytics

MATERIALS:

- Small plastic zipper storage bags (any kind but freezer type are best, 12 to 19 cm high) - one for each student or each group
VARIATION – you can use glass or clear plastic jars or cups for this as well (see photo at right). They just take up space and glass is a breaking hazard.
- Lima bean seeds (Other bean, pea, sunflower or other quick growing seeds can also be used but Lima beans are large and easy to handle.)
- Paper towels - 2 standard sheets per bag
- Spray bottle (or plant mister) of clean water
- Labels (or masking tape)
- Markers

SAFETY TIPS AND HINTS

- Dried beans and seeds are choking hazards for small children.
- There is small possibility of mould growth - be aware of students allergic to this.
- GERMINATE SEEDS FASTER - pre-soak them in a shallow container of warm water for up to 24 hours. That will soften the hard outer shell of the seed. Don't soak for longer as they may go mouldy.
- Prepare a bean in a bag ahead of time to show the students how it should look.



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LOCATION:

- WARM WEATHER: choose a window where the seeds will get plenty of light, but won't be blasted by intense sun all day. Tape the bag in the window with the beans facing indoors, so that the students can watch them as they grow.
- COLD WEATHER: If your windows are freezing cold, hang a large piece of plastic on a bulletin board and pin the bags there.



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PROCEDURE:

Step 1:

Have students put a label on their bag with their name down one side so as not to block the view of the seed growth.

Step 2:

Next, have students fold the paper towel a few times so it can fit into the zipper storage bag. (Plan this ahead of time. Depending on the size of bag you are using, two standard towels usually need to be folded 3 times.)

Step 3:

Students can now slide the paper towel into the bag. Smooth it so that it's relatively flat.

Step 4:

As you come around have the students hold open their ziplock bag. Use the spray bottle with water to spray the paper towels as they are ready. Just dampen them. DO NOT FLOOD IT!



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Step 5:

Have students position two beans or seeds about three centimeters from the bottom of each bag, on one side of the paper towel. Flatten the bag to set the seed in place.

Don't worry if they don't stay in place, but if necessary, stuff a little piece of paper towel into the bottom of the bag so that the seeds aren't sitting in any water.

Step 6:

Have the students gently blow a little air into the bag and seal it.

Step 7:

Tape the bags to a window or hang on a bulletin board depending on temperature.

NOTE: Hang at a height students can see easily.

Step 8:

Have the students make daily observations.



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OBSERVATIONS:

Have students make a science journal to record their observations. (See template provided.) They can check their seed each day, drawing and measuring them when something changes.

- Write today's date.
- What do you see in your seed bag?
- When does the root pop out of the side?
- Record when you first see root hairs.
- When does the seed start to push up?
- Look for the shoot to come up and record it.
- Measure the height/length of the roots and shoot as they grow.
- When does a leaf appear. When does the next set of leaves appear?

How to Explain the Science

Dried beans (peas, etc.) are seeds that contain "sleeping" (dormant) "baby" plants (embryos). These tiny plants need signals to make them "wake up" and begin growing. Germination is the name for this "waking up".

Did You Know?

Some seeds need dark to germinate while others do better with light like:

- Lettuce
- Begonia
- Coleus
- Geranium
- Impatiens
- Lobelia
- Petunias
- Snapdragons



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These signals to germinate include light, air, and water. Temperature can also play a role, which is why you don't want to put your seed against a freezing cold window.

When a seed is moistened, it absorbs water and swells, breaking the seed coat.

This also triggers the plant to start getting its "food" that is stored (in the *cotyledon* - *this term is introduced in the "Plant Parts" lesson*). You can see the seed shrinking as the plant grows. As a plant gets older, it uses the roots and leaves to get the energy it needs. Once it begins to grow its second set of leaves and uses up the food in the seed, the sprout will need to be planted into soil or placed in a hydroponics container.



ENRICHMENT - VARIATIONS

- Explore whether seeds need light to germinate. Put one bag of beans in a window, and another one in a dark closet.
- Plant more than one type of bean or seed to compare how quickly they germinate or grow. Be sure to keep them under the same conditions.
- Use a smart phone or camera to record plant growth. Use good lighting and place a ruler next to the plant to show the actual size.

VIDEOS

Grow a Bean in a Bag - Carnegie Science Center

https://www.youtube.com/watch?v=E2_84NnJa3A

Plant Life Cycle of a Bean Seed - We Are Teachers

<https://www.youtube.com/watch?v=pg92csplY0I>

What is a plant? - Free School (Grade 3-7)

<https://www.youtube.com/watch?v=qULkjDccCeY>

How Do Plants Grow? | CURIOUS QUESTIONS (Gr 2-3)

https://www.youtube.com/watch?v=i-eYGWOL_Uo

Parts Of A Plant | The Dr. Binocs Show (vocab a bit high but visuals work)

<https://www.youtube.com/watch?v=p3St51F4kE8&t=52s>

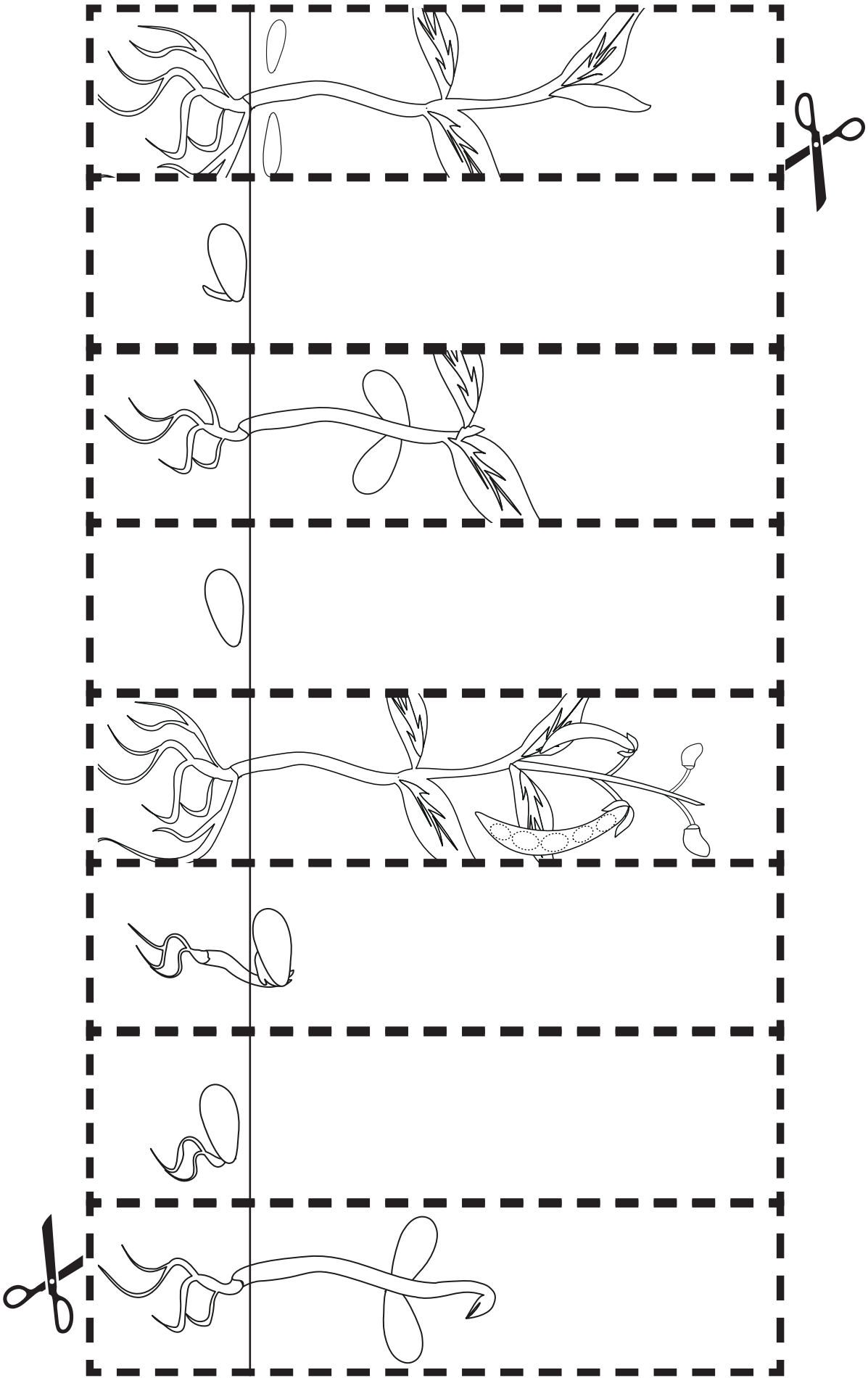
What Is Seed Germination? - Dr Binocs Show (vocab high but visuals work)

https://www.youtube.com/watch?v=JSe_VUMymjo&list=PLmJ33rwb-1zZYj7vMjW7byQGRaaZKz6vBG&index=28&t=154s

Alberta Curriculum Connections

Gr.	Subject	Curriculum Connection	Detail
1	Science	Topic B: Seasonal Changes	-Identify and describe examples of plant and animal changes that occur on a seasonal basis
		Topic E: Needs of Animals and Plants	-Identify the requirements of plants to maintain life; i.e., air, light, suitable temperature, water, growing medium, space; and recognize that we must provide these for plants in our care. -Identify ways that land plants depend on soil.
1-3	Health	Nutrition	-Recognize the importance of basic, healthy, nutritional food choices to well-being.
2	Math	Shape And Space (Measurement)	-Relate the size of a unit of measure to the number of units used to measure length. -Compare and order objects by length. -Measure length to the nearest nonstandard unit.
	Math	Statistics And Probability (Data Analysis)	-Gather and record data -Construct and interpret concrete graphs and pictographs
3	Math	Shape And Space (Measurement)	-Relate the passage of time to common activities, using nonstandard and standard units (minutes, hours, days, weeks) -Demonstrate an understanding of measuring length (cm, m).

Colour and Cut Them Out



How Plants Grow

Use Glue To Put Them in Order

1									
2									
3									
4									
5									
6									
7									
8									

The new seed goes here.

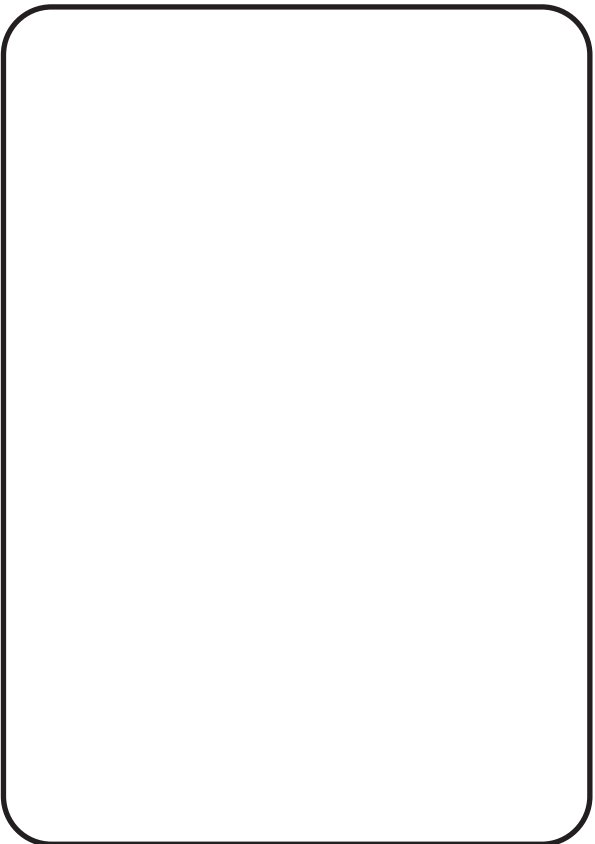
What picture comes next?

Name: _____

Today's Date: _____

Name: _____

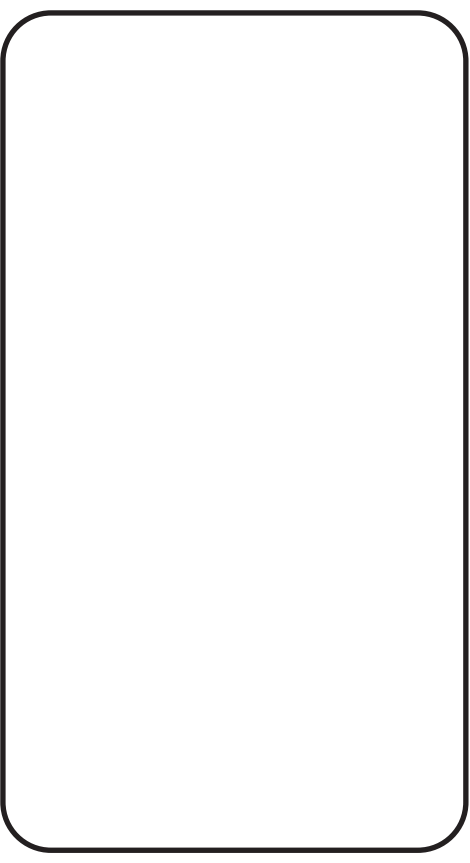
What did I see?



What is new today?

What did I measure?:

Science Journal

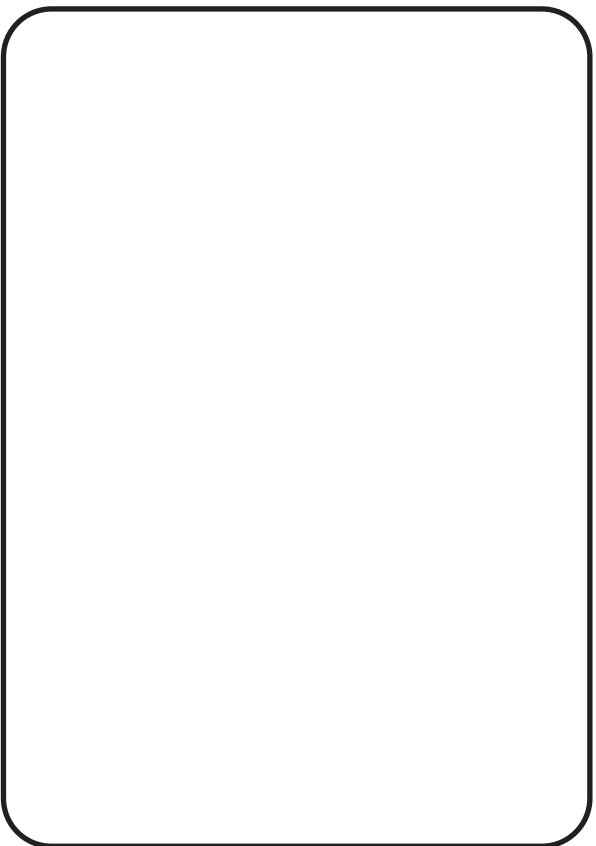


What I am studying:

The date I started:

Today's Date: _____

What did I see?

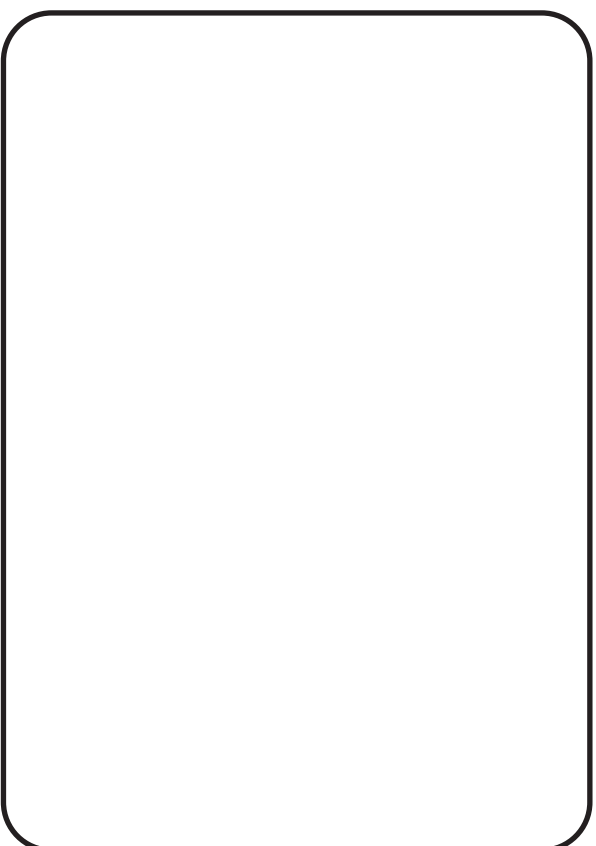


What is new today?

What did I measure?:

Today's Date: _____

What did I see?



What is new today?

What did I measure?:
