NAME:	NURTURES	LEARNING PLAN:	Life Science – NURTURES Institute – Inquiry Lesson
GRADE:	K, 2nd	LESSON NAME:	Plant Exploration
DOMAIN:	Life Science (LS)	DURATION:	60 mins (3 segments: 15mins, 30mins, 15mins)

NOTES: In this introductory lesson, students will explore model(s) of plant parts and plant processes. Next, students make observations and collect data on real plants as they progress through a series of centers. This lesson concludes with students working together to identify plant parts and share data from their center observations. This lesson is designed to prime student experience with observation and data collection.

STANDARDS

Performance Expectation (targeted by the end of the unit):

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

- DCI(s) targeted for this lesson:
  Kindergarten – NGSS
  LS1.C: Organization for Matter and Energy Flow in Organisms - All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

  2nd Grade – NGSS
  LS2.A: Interdependent Relationships in Ecosystems - Plants depend on water and light to grow.

- SEP(s) targeted for this lesson:
  Developing & Using Models – (K-2) … distinguish between a model & the actual object…
  Analyzing & Interpreting Data – (K-2) … use observations (firsthand or from media) to describe patterns or relationships.

- CC(s) targeted for this lesson:
  Systems & System Models – (K-2) …objects and organisms can be described in terms of their parts.
  Structure & Function – (K-2) …shape and stability of structures are related to their function(s).

LEARNING PERFORMANCE(S)

Students **explore & make observations** of **common household plants** to begin thinking about how plant **structure & parts** are used to get the **basic needs of water, light & nutrients**.

INSTRUCTIONAL SEQUENCE

Materials needed: Internet access – whole group or devices, seeds – packets or from fruit/veg, plants – 3 that can be handled and examined/deconstructed, observation tools – tweezers, plastic knives, magnifying glass, rulers, label sticks.

Instructional strategies:

- Use of model(s) to engage thinking and provide vocabulary terms
- Firsthand observations of plants in centers

- Consolidation of experiences with discussion and active model use

Time required: 60 mins (3 segments: 15mins - models, 30mins - centers, 15mins - discussion)

Cautions: typical cautions for students using observation tools and working with live plants.

Introducing the Lesson:
- Gather students and tell them they will be exploring plants today. Tell them scientists use models to help make sense of the way things work and they will use a model to help make sense of plants.

Instructional Tactics:
Model segment
- If tablets/devices are available have students use otherwise display for all – have student's access: https://www.dkfindout.com/us/animals-and-nature/plants/
- Have students choose some sections they are interested in – be sure to have them see and discuss the plant life cycle - https://www.dkfindout.com/us/animals-and-nature/plants/life-cycle-plant/
- After a short overview – open the Parts of a Plant model page - https://www.dkfindout.com/us/animals-and-nature/plants/parts-plant/

- For K - Give the students a ~1min to look at the model – before they click the descriptions, ask students to share their ideas about what the plant parts do. Record or verbally highlight responses.

  Let the students click on the parts and help/guide their reading of the boxes explaining the role of each part. Be sure to emphases how the parts pertain to plant needs of water, light, nutrients…

- For 2nd – Give students time to explore the model – encourage them to click the info boxes and read the descriptions. Give them ~3mins to explore then go back to the plant parts model and ask students to share their ideas about what each part does – use the descriptive info to help affirm understanding. Be sure to emphases how the parts pertain to plant needs of water, light, nutrients…

- For 2nd – encourage students to explore the other models and information about how plants grow and reproduce - https://www.dkfindout.com/us/animals-and-nature/plants/

- To conclude this segment – ask students how this model and the other models (e.g., life cycle of a plant) showed them something new or helped them to understand how plant parts work – gather their ideas verbally.

  Developing & Using Models – (K-2) … distinguish between a model & the actual object… **K-LS1.C:** Organization for Matter and Energy Flow in Organisms - All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. **2-LS2.A:** Interdependent Relationships in Ecosystems - Plants depend on water and light to grow.
  Discourse opportunities: Open-end/sequenced questions, Talk Moves – elaboration, agree/disagree

Plant exploration centers:
- For this segment you will setup 5 centers that will allow students to explore the different parts of plants. In advance determine the best center scheme for your class. The intention is to prime student experience with making observations using live plants. Look for opportunities to use vocabulary and call backs to the plant parts model. The overarching theme of the needs of plants will be approached by this exploration of the structures/parts of plants that allow plants to get the water, light, and nutrients they need.

  Students should have access to the basic tools of tweezers, magnifying glasses, rulers (or unifix cubes), scissors, craft sticks, paper strips. **NOTE**: students should be encouraged and supported to "get their hands dirty" during this exploration.

- To begin, remind students how scientists create and use models to help them understand or make sense of things. The students used the plant model to help them understand the parts of a plant – and now, just like scientists they are going to examine the real thing – plants and their parts. Send students to the centers to begin. As students work in centers, be sure to circulate and listen to what students are saying, their observations, and their peer-to-peer conversations. Be sure to ask probing questions to engage thinking (e.g., what do you see? Why do you think X does that…or is shaped that way? How do you know…?)

- **Seeds:** Provide a selection of seeds – packets of seeds that can be grown, seeds from seasonal fruits if available (apple seeds – even an apple cut in half with seeds visible). Students should be encouraged to use the tools and their senses to make observations. Use a journal page [see suggested journal page] to help scaffold data collection – such as draw a picture of a seed(s), check boxes for characteristics, prediction of grown plant).

- **Roots:** Provide one or two plants that have been removed from their containers and their roots are visible and accessible to touch. Students should be encouraged to use the tools and their senses to make observations. Use journal page to help scaffold data collection (draw a picture of the roots with a call out box for how the root sits in the soil with water, air, and nutrients – introduced in journal see what kids do).

- **Stem:** Provide one or two plants (in or out of containers) that have prominent stems with leaf stocks or shoots. Students should be encouraged to use the tools and their senses to make observations – including cutting the stem to see the inside. Use journal page to help scaffold data collection (draw a picture of the stem with a call out box for how the stem looks inside.

- **Leaves:** Provide one or two plants (in or out of containers) that have leaves. Students should be encouraged to use the tools and their senses to make observations. If possible, include a variety of leaves – from outdoors and from food (e.g., tree leaves, pine/evergreen growth, grass, lettuce) Use journal page to help scaffold data collection (draw picture, describe textures, describe structure, explore ideas of area with length x width).

- **Flowers, Fruit, and Vegetables:** Provide a selection of familiar fruits, vegetables, and flowers that have seeds to examine. Students should be encouraged to use the tools and their senses to make observations. Use journal page to help scaffold data collection (draw pictures, describe textures, familiarity to seeds from seed center).

  Analyzing & Interpreting Data – (K-2)… use observations (firsthand or from media) to describe patterns or relationships. **Systems & System Models** – (K-2) …objects and organisms can be described in terms of their parts. **Structure & Function** – (K-2) …shape and stability of structures are related to their function(s). **Discourse opportunities** – Encourage talk, Vocabulary use, Talk Moves to make thinking visible.

Analyzing & Interpreting Data:
- Gather students to discuss their explorations with the plant parts.
- Be sure to display the Parts of a Plant model page for reference during the discussion - https://www.dkfindout.com/us/animals-and-nature/plants/parts-plant/
- Use one of the plants from the center – that was removed from the pot so you can see roots, stem, leaves. Ask students to help you label the real plant – just like the model. Have labels in sticks that you can insert of attach to the plant parts – Roots, Stem, Leaf Stock, Leaves – and if available flower buds, flowers, etc. Also, include a few labels for the plant needs – water, light, nutrients.
- Tell the students that not only are they going to label the plant, but they will share data about the plant parts they observed to help make sense of what the parts do.

  During this labeling be sure to ask students – why they think that is the specific part and how do they know that. Ask them to share data from their journals about each part. Verbally highlight when connections are made to the parts helping plants meet their basic needs.

  Example interaction:
  Teacher: All right, what do you think these parts of the plants are?
  Student(s): Roots!
  Teacher: What about these very small, fine parts of the root.
  Students: Root hairs!
  Teacher: Why do you think that?
  Students: it said so in the model
  Teacher: Ok – very good, using the model to help make sense. What did the model say roots did for the plant?
  Student(s): that's where it gets its water
  Teacher: Where it gets its water…hmm. How do you think these roots help this plant get water? What did you notice during your exploration?
  Student(s): the dirt…I mean soil was wet, it got water on the stick and paper strips.
  Teachers: Very nice observation – what do you think that means – that the roots were in the soil, the soil was wet…what could be happening.

Developing & Using Models – (K-2) … distinguish between a model & the actual object… **Analyzing & Interpreting Data** – (K-2)… use observations (firsthand or from media) to describe patterns or relationships. K-LS1.C: Organization for Matter and Energy Flow in Organisms - All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. 2-LS2.A: Interdependent Relationships in Ecosystems - Plants depend on water and light to grow. **Discourse opportunities** – Encourage talk, Vocabulary use, Talk Moves to make thinking visible.

FOCUS QUESTION

What parts make up a plant and what do those parts do?

EVALUATION

Meaningful Learning Outcomes:

Experience with models and comparing with the real object - plants

Experience observing, collecting, and using data to make sense of plants needs

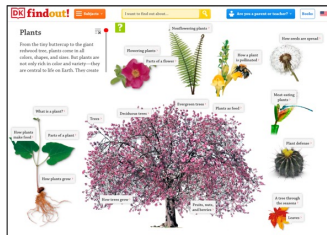Plants are made up of parts and those parts help plants get what they need to live

Based on SLIDE lesson plan format used in Krajcik, J. and Czerniak, C.M. (2018). Teaching Science in Elementary and Middle School. New York: Routledge.

K/2: Plant Exploration

lesson setup guide

1

Models – for group or on devices

2

seeds

roots

stems

leaves

flowers, fruit. veg

Centers – each center should have materials (e.g., seeds, plant roots) and tools (e.g., tweezers, magnifying glasses) to support the exploration of each type of plant part

3

leaf

roots

stem

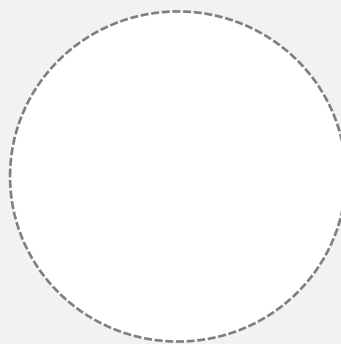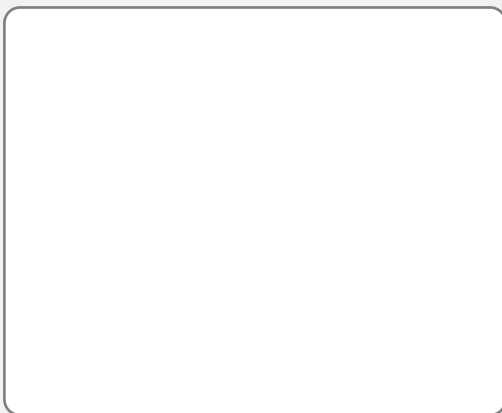**Labels** – label plant parts and needs during discuss
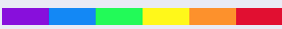
sample journal page

Center: _____

Draw what you observe…

Draw what you observe… **up close**

Characteristics	Observations
Texture	smooth | rough | _____
Color	▬▬▬▬▬▬ | _____
Smell	This smells like _____
Sound	loud | quiet | sounds like _____
Moisture	dry | damp | wet | soggy | _____
Size	big | little | long | short | _____inches
Other	

Suggestion: vary the 'zoom' box to ask for what students **see up close**, **what they think is happening** (e.g., draw what the roots are doing in the soil) or **what is inside** (e.g., what does the inside of the stem look like
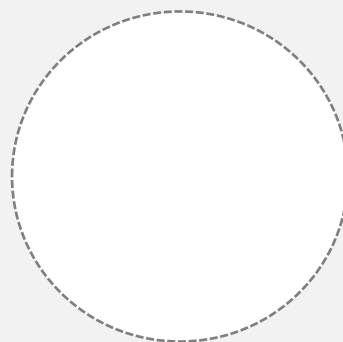
Center: _____

Draw what you observe...

Draw what you observe... **up close**

Characteristics	Observations
Texture	
Color	
Smell	
Sound	
Moisture	
Size	
Other	

Suggestion: vary the 'zoom' box to ask for what students **see up close**, **what they think is happening** (e.g., draw what the roots are doing in the soil) or **what is inside** (e.g., what does the inside of the stem look like