

Producers & the Cycling of Matter

Teacher Facilitation Notes

In General . . .

- Project the slide deck in edit mode—do not show it as a slideshow.
- Hide the speaker notes before projecting. (View/Show Speaker Notes)
- Hide the toolbar. (Click on the up arrow at the right end of the tool bar.)
- Call on students to read the various content shown on slides.
- For each investigation, assemble the needed materials for each group and place in a central location for ease of distribution.
- Duplicate copies of the data sheets for each student.

Materials Needed:

Engage: Living Sunlight

Goldfish® Crackers, 1 box per class

Small baggies, 1 per student

Potted plant

Explore:

Recipe for Producers, 1 per student

Pencil, 1 per student

Explain: Living Breathing Plants

Living, Breathing Plants, 1 per student

Pencil, 1 per student

Elaborate: Producers & the Recycling of Matter

Photosynthesis Diagram, 1 per student

Pencil, 1 per student

Evaluate

Quiz, 1 per student

Producers & the Cycling of Matter

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Engage: Energizing Sunlight

- Before beginning this lesson, place about 10-15 goldfish in a small baggie for each student.
- Remind students of proper lab procedures: *Do not eat anything unless you are given permission to do so.*
- Give each student a baggie of Goldfish® crackers. Ask:
 - What's in your baggie? Are these crackers food?
 - Why do we eat food? (Make sure students point out that they get their energy from food.)
- Ask students if they know what ingredients are in the crackers and how they are made. Discuss the source of each listed ingredient, i.e., flour comes from wheat, a plant.
- As students eat their crackers, make a point to drop 2-3 crackers onto the soil of a potted plant. Ask: *Can I feed a plant crackers like I just fed you crackers? Why or why not?*
- Remind students that plants are organisms and one of the needs of organisms is food. Plants need food but they don't have mouths to eat it. Ask: How do you think plants get the food they need to survive and thrive?
- Discuss how plants are producers. If desired, have students draw a plant in their science notebooks and define the term *producer* next to it.

Explore #1: Producers–Energy Comes Alive

- Read and discuss the introductory slide.
- Play the video on the second slide in this section. (It is only 10 seconds long—just enough time to read the title of the book, its subtitle, and the names of the authors.) Use the discussion questions to set a purpose for reading the book.
- Start the video on the next slide, but stop it immediately so that the students can see the picture of the child on a swing. Tell the students that all the little yellow dots on the pictures in this book represent light energy coming from the sun. Discuss, using the questions on the slide. Tell students to watch how the yellow dots move and change during the reading of the book.
- Play the video and ask students how the light can be in the plants and in the child's body.
- Continue viewing each slide, discussing the other illustrations, questions, and facts as you go.

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Explore #2: Living, Breathing Plants

- Read and discuss the introductory slide.
- Play the video on the second slide in this section. (It is only 10 seconds long—just enough time to read the title of the book, its subtitle, and the names of the authors.) Use the discussion questions to set a purpose for reading the book.
- Start the video on the next slide, but stop it immediately so that the students can see the picture of the child on a swing. Tell the students that all the little yellow dots on the pictures in this book represent light energy coming from the sun. Discuss, using the questions on the slide. Tell students to watch how the yellow dots move and change during the reading of the book.
- Play the video and ask students how the light can be in the plants and in the child's body.
- Continue viewing each slide, discussing the other illustrations, questions, and facts as you go.
- After watching all of the video, have the students complete the data sheet, *Recipe for Producers*. Discuss as desired.

Explain: Two Gifts From Plants; Our Gift to Plants

- Read and discuss the introductory slide.
- Continue viewing each slide, discussing the other illustrations, questions, and facts as you go.
- As you go through this section, remind students that even though they cannot see oxygen or carbon dioxide, they are gases, which makes them matter. Point out how matter (the gases and the sugars) go from one organism to another during the oxygen/carbon dioxide cycle.
- Facilitate a class discussion on what they learned during the videos.
 - Where do animals get their energy?
 - Where do plants get their energy?
 - Why are plants called producers?
 - What gas do plants release into the air? What gas do they absorb?
 - What gas do animals and people breathe out into the air? Breathe in?
 - Where do animals get the matter that adds to their body as they grow?
 - Where do plants get the matter that allows them to grow?
- Have students complete *Living, Breathing Plants*.

Note: Be sure to wait for the video to stop. Some videos have multiple pages of the book.

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Elaborate: Producers & the Cycling of Matter

- Read and discuss the introductory slide.
- Have students follow the directions on the slide to complete their diagram.
- Discuss as desired.

Evaluate

- Let students complete the quiz independently.
- Discuss as desired.

Producers & the Cycling of Matter

Name: Key

Explore: Recipe for Producers

Directions: Use terms from the word box to complete the recipe plants follow to make their own food! (Use each term one time.)

Term Bank

carbon dioxide	energy	food	oxygen
sugar	sugar	sunlight	water

Ingredients:

- Carbon dioxide (from the air)
- Sunlight
- Water

Instructions:

1. Absorb water from the ground with your roots.
2. Catch sunlight during the day with your leaves.
3. Use energy from the sun to get things going.
4. Breathe in carbon dioxide from the air.
5. Use solar energy and carbon dioxide to make sugar.
6. Breathe out oxygen into the air.
7. The sugar that you make is your food.
8. Use the sugar you produce to make all your parts: leaves, fruit, flowers, stems and roots.

Producers & the Cycling of Matter

Name: Key

Explain: Living, Breathing Plants

Directions: Circle the three things that producers need to make their own food.

water soil carbon dioxide fruit sunlight worms

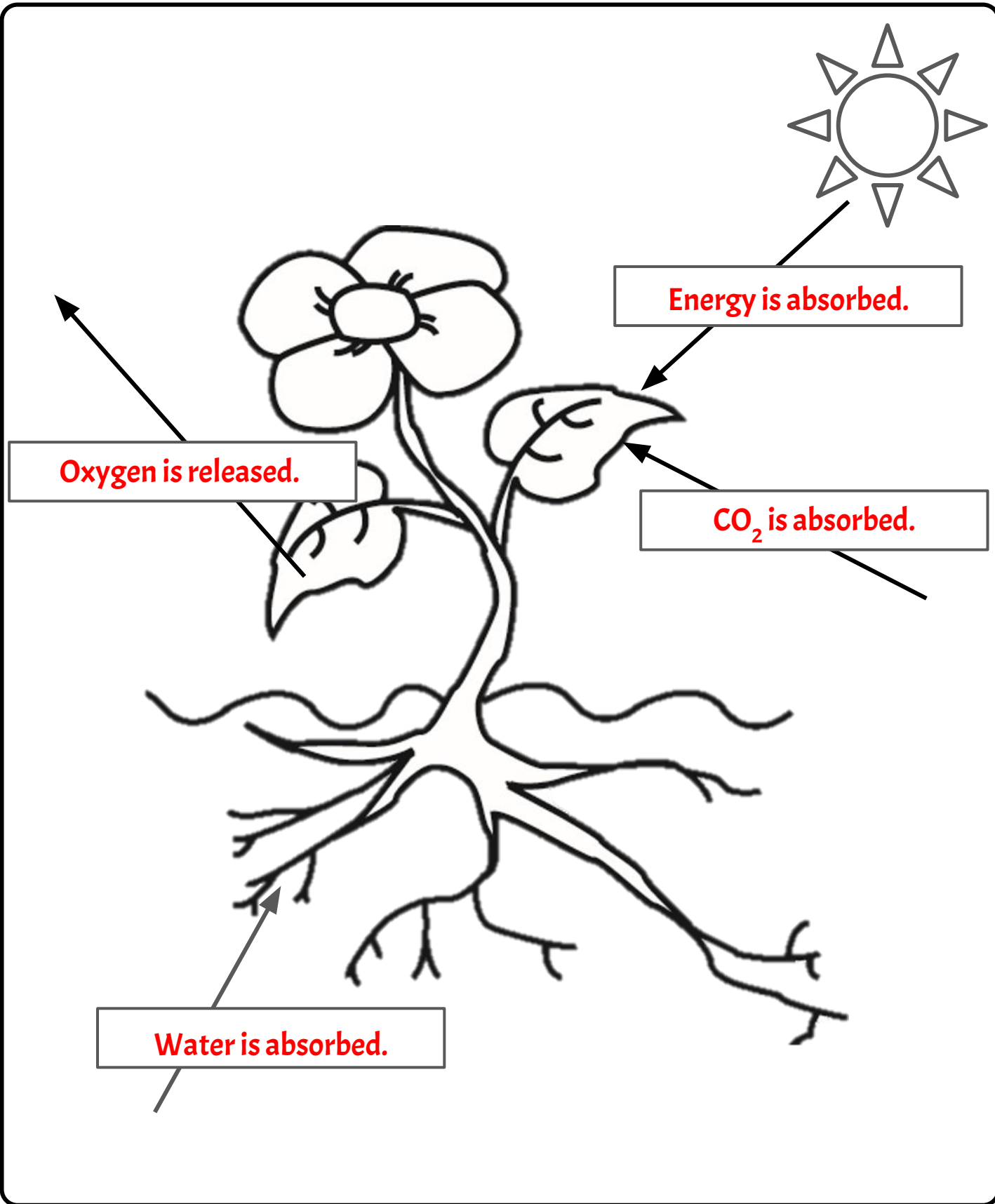
Directions: Write a **T** or an **F** to tell if each statement is t true or f false.

1. **T** Producers make their own food from flowers.
2. **T** Most green plants are producers.
3. **T** Plants absorb water from the soil when making their own food.
4. **T** Sunlight provides energy for producers to make their own food.
5. **F** Plants release carbon dioxide from their leaves.
6. **T** Animals and people need the oxygen plants release in order to live.
7. **F** Plants absorb oxygen and release carbon dioxide during photosynthesis.
8. **F** People get the energy they need to live directly from the sun.
9. **F** Producers are not necessary to keep animals and people alive.

Producers & the Cycling of Matter

Name: Key

Evaluate



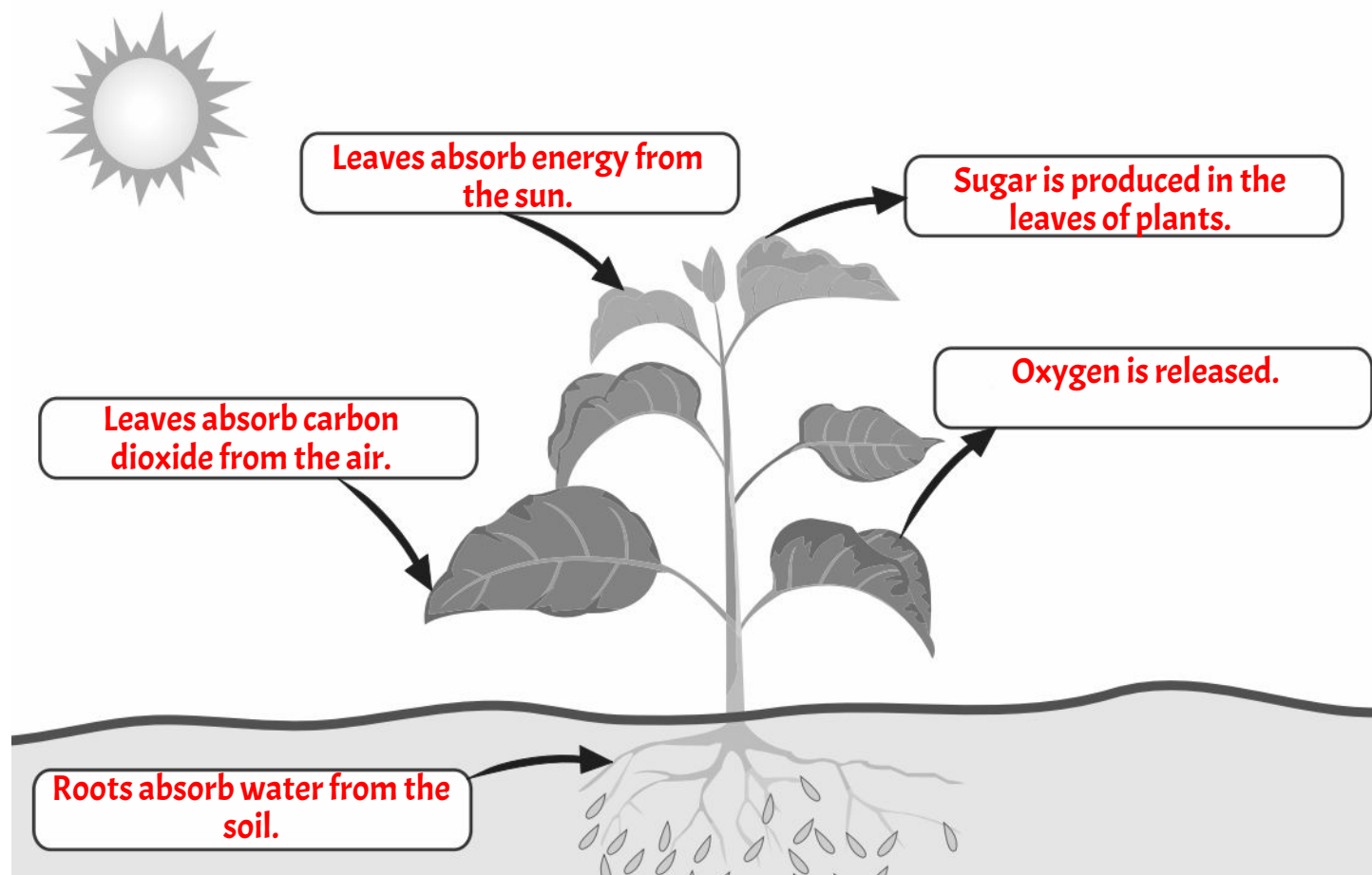
Producers & the Cycling of Matter

Name: Key

Evaluation

Directions: Write either *in* or *out* in each blank below. Reminder: breathe in means to inhale while breathe out means to exhale.

1. Plants breathe in carbon dioxide.
2. Animals breathe out carbon dioxide which plants need to live.
3. Plants breathe out oxygen, which animals need to live.
4. Animals breathe in oxygen.
5. Label the illustration below to show how plants and animals breathe. (The arrows show the flow and cycle of matter and energy as producers make their own food.)



Producers & the Cycling of Matter

Name: Key

Evaluation

6. Where do producers get the energy they need to grow, stay alive, and produce their own food?
- F Water
 - G The soil
 - H Sunlight
 - J Carbon dioxide
7. What gas do producers need to make their own food during photosynthesis?
- A Carbon dioxide
 - B Carbon monoxide
 - C Oxygen
 - D Nitrogen
8. What two products does a producer make during photosynthesis?
- F Water and sugar
 - G Oxygen and water
 - H Carbon dioxide and sugar
 - J Oxygen and sugar
9. What do producers need from their environments in order to make their own food? Mark all answers that apply.
- A Water
 - B Oxygen
 - C Sunlight
 - D Animals
 - E Carbon dioxide
 - F Soil

Producers & the Cycling of Matter

Name: _____

Explore: Recipe for Producers

Directions: Use terms from the word box to complete the recipe plants follow to make their own food! (Use each term one time.)

Term Bank

carbon dioxide	energy	food	oxygen
sugar	sugar	sunlight	water

Ingredients:

- Carbon dioxide (from the air)
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Instructions:

1. Absorb _____ from the ground with your roots.
2. Catch _____ during the day with your leaves.
3. Use _____ from the sun to get things going.
4. Breathe in _____ from the air.
5. Use solar energy and carbon dioxide to make _____.
6. Breathe out _____ into the air.
7. The sugar that you make is your _____.
8. Use the _____ you produce to make all your parts: leaves, fruit, flowers, stems and roots.

Producers & the Cycling of Matter

Name: _____

Explain: Living, Breathing Plants

Directions: Circle the three things that producers need to make their own food.

water soil carbon dioxide fruit sunlight worms

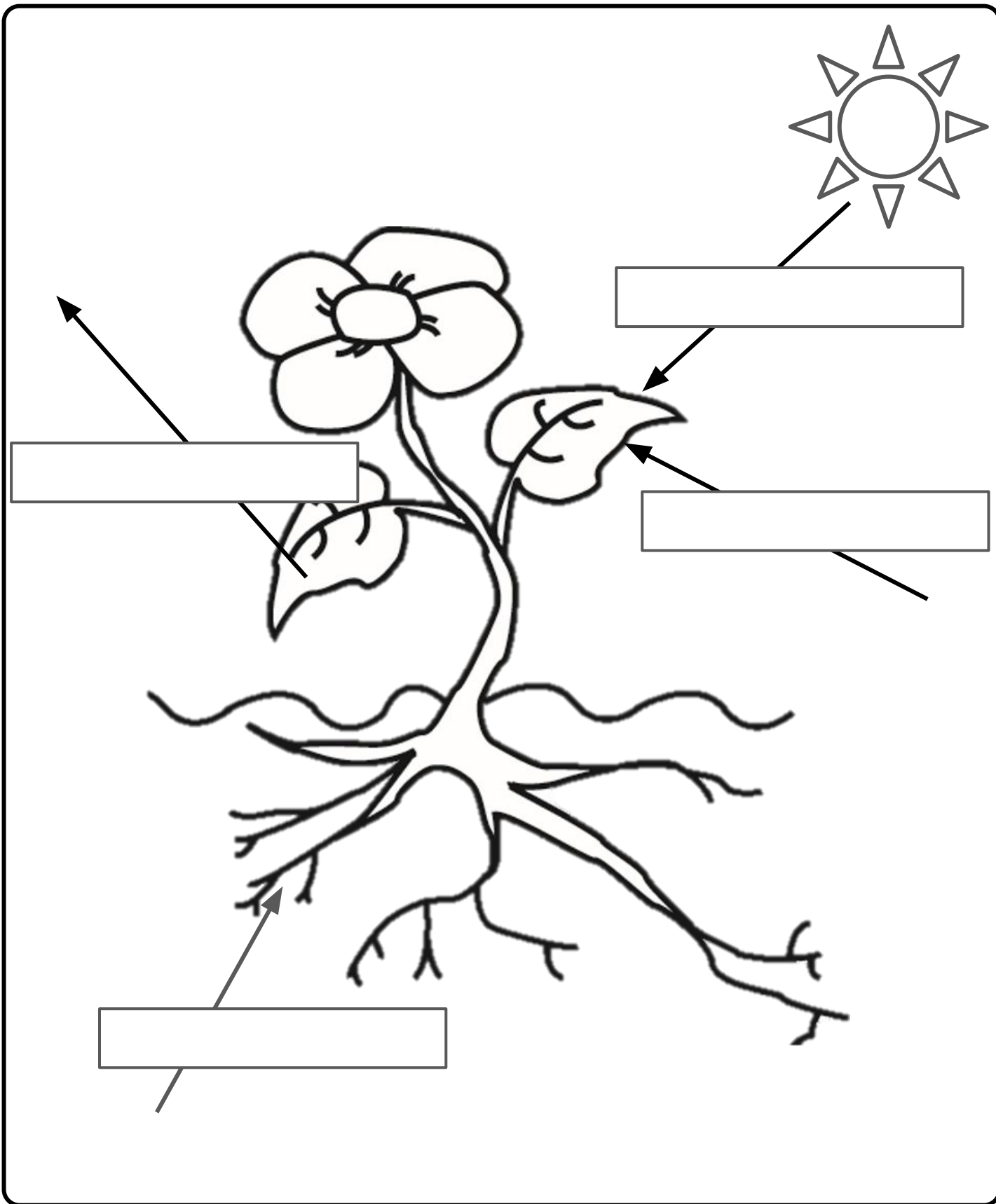
Directions: Write a **T** or an **F** to tell if each statement is t true or f false.

1. _____ Producers make their own food from flowers.
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5. _____ Plants release carbon dioxide from their leaves.
6. _____ Animals and people need the oxygen plants release in order to live.
7. _____ Plants absorb oxygen and release carbon dioxide during photosynthesis.
8. _____ People get the energy they need to live directly from the sun.
9. _____ Producers are not necessary to keep animals and people alive.

Producers & the Cycling of Matter

Name: _____

Elaborate: Photosynthesis Diagram



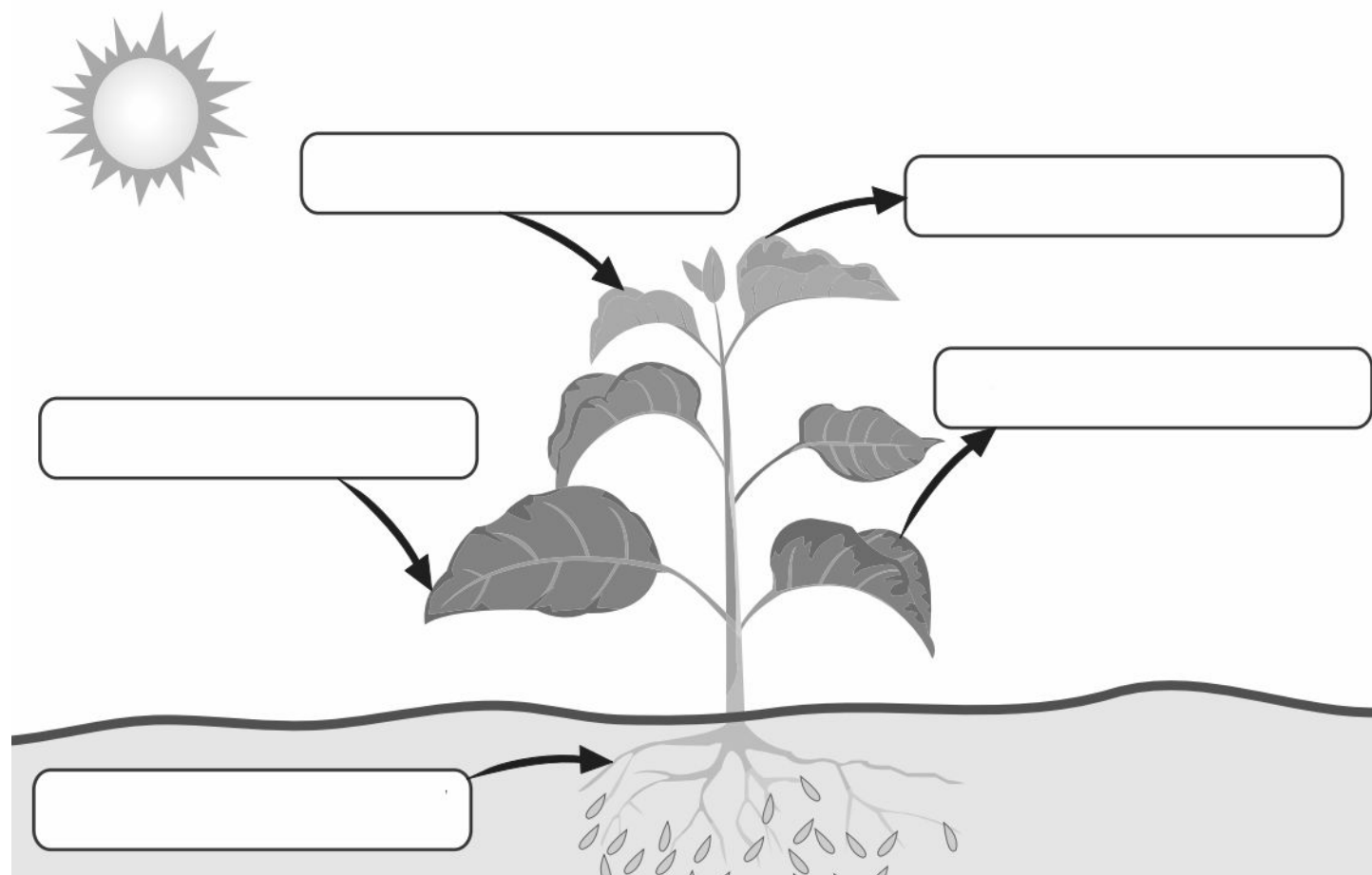
Producers & the Cycling of Matter

Name: _____

Evaluation

Directions: Write either *in* or *out* in each blank below. Reminder: breathe in means to inhale while breathe out means to exhale.

1. Plants breathe _____ carbon dioxide.
2. Animals breathe _____ carbon dioxide which plants need to live.
3. Plants breathe _____ oxygen, which animals need to live.
4. Animals breathe _____ oxygen.
5. Label the illustration below to show how plants and animals breathe. (The arrows show the flow and cycle of matter and energy as producers make their own food.)



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Name: _____

Evaluation

6. Where do producers get the energy they need to grow, stay alive, and produce their own food?
- F** Water
 - G** The soil
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7. What gas do producers need to make their own food during photosynthesis?
- A** Carbon dioxide
 - B** Carbon monoxide
 - C** Oxygen
 - D** Nitrogen
8. What two products does a producer make during photosynthesis?
- F** Water and sugar
 - G** Oxygen and water
 - H** Carbon dioxide and sugar
 - J** Oxygen and sugar
9. What do producers need from their environments in order to make their own food? Mark all answers that apply.
- A** Water
 - B** Oxygen
 - C** Sunlight
 - D** Animals
 - E** Carbon dioxide
 - F** Soil