

Substitute Guide: Food Webs and Energy Flow

Grade: 4 **Subject:** Science **Time:** ~45 min core + ~15 min extension Science

Read this first (1 minute)

You do not need a science background to run this. Everything students need is printed in their packet. There are **no lab materials and no hazards** — it is all on paper with a pencil. The whole packet takes about 45 minutes, plus an optional 15-minute activity for early finishers. Your job is to hand out the packet, read the start-up script aloud, and keep the room working quietly.

Learning goal (plain language)

Students learn that energy in a meadow starts with the **Sun**, that **producers** (plants) make their own food, **consumers** eat other living things, and **decomposers** break down dead things. They read a **food web** where each **arrow means "energy goes to"** and points toward the eater. Then they label organisms, trace a food chain, and predict what happens when one living thing is removed.

Standards alignment

Framework: 19 TAC Chapter 112 (Grade 4 Science, 2021 TEKS). Focus: food webs, energy flow, and the roles of organisms (producers, consumers, decomposers) in an ecosystem.

- **Provisional SE (food webs / energy flow):** describe how energy flows through a food web, from the Sun to producers to consumers. verification_status: pending
- **Provisional SE (roles of organisms):** identify and describe the roles of producers, consumers, and decomposers in an ecosystem, and predict the effect of a change to the web. verification_status: pending

Provisional — the specific section number and student-expectation codes are pending educator verification against the current official TAC source.

Standards are paraphrased here, not quoted, and this packet does not claim formal alignment to the TEKS. Please confirm the section and codes against your official source.

Setup Before class (5 min)

- Count and hand out one **student packet** per student.
- Confirm each student has a **pencil**. No calculators, computers, or lab items are needed.
- Write the date on the board and remind students to fill in the name line.
- Keep the **answer key** with you — it is a separate file and is **not** in the student packet.

Materials What's needed

- Printed student packet (about 3–4 pages) per student.
- Pencil per student.
- This guide and the separate answer key (teacher only).
- No technology, no calculator, no lab equipment, no safety hazards.

Timing Suggested pacing (~45–60 min)

Segment	Time	What students do
Start — Notice & Wonder	5 min	Q1–Q2 warm-up
Build — Read the science	5–10 min	Read box, word bank, Figure 1; Q3
Apply — Use the food web	20 min	Q4–Q7 (label, trace, what-if, O/I)
Explain — CER	5–10 min	Q8 claim/evidence/reasoning
Close — ACE	5 min	Articulate / Connect / Extend
Continue — early finishers	optional ~15 min	Add a rabbit and draw its arrows

Script Read aloud to start

"Today's assignment is a paper science activity called *Food Webs and Energy Flow*. You will work by yourself with just a pencil — no computers and no supplies. First, do the two warm-up questions at the top. Then read the short box and look at the food-web picture. In the picture, every **arrow means energy goes to** whatever eats it — the arrow points to the eater. After that, use the picture to answer the questions. If a question is tricky, skip it and come back. You may read the words out loud to yourself. Put your name, class, and date at the top now. You have about 45 minutes — raise your hand if you need a word read to you."

Support When students ask for help

- **You may read any part aloud** to a student or the whole class.
- If they are stuck, point them to the **Word Bank** and **Figure 1** — the ideas they need are right there.
- For the arrows, remind them: "follow the arrow to see who gets the energy — it points to the eater."
- Do **not** give answers; prompt with "What does the arrow point to?" or "What does that animal eat in the picture?"
- It is fine if a student cannot finish the optional early-finisher task.

Access Accommodations & language support

- **Read-aloud** of any passage or question is allowed for all students.
- Point students to the **sentence starters** and the **Word Bank** (definitions provided).
- Extended time is fine; the core can stop after Q8 if time runs short.
- Students may answer in short phrases or by pointing/labeling if writing full sentences is a barrier, as long as the idea is clear.
- The packet is grayscale-safe — it prints and reads clearly in black and white.

Tools Allowed & not allowed

Allowed: pencil, the printed packet, quiet self-read-aloud. **Not needed / not allowed:** calculator (no math required), phones, computers, lab materials.

Collect at the end: Collect every packet, finished or not, with names on them. Stack them for the teacher. Note on a sticky how far most students got and any questions that caused confusion.

Answer key: The **answer key is a separate file** (answerkey.html) and is for the teacher only. Please do not hand it to students.

Teacher follow-up (for the returning teacher)

Watch for the common idea that food-web arrows point from the eater to its food — they point the other way, toward the eater, because they follow the energy. Also watch for "the Sun is a consumer" and "removing one thing changes nothing." A quick next-day discussion tracing energy from the Sun to a producer to consumers, and a "what if we remove this?" round, would reinforce these well. The CER (Q8) responses show who can use an arrow from the web as evidence.

G04_SCI_FoodWebs_01 — Food Webs and Energy Flow Substitute Guide

Food Webs and Energy Flow

Grade: 4 **Subject:** Science **Time:** ~45 min + ~15 min extra **Work mode:** By yourself · pencil only Science

Start Here

This is a **paper science activity**. You will read a little, look at a picture, and answer questions with a pencil. You do **not** need a computer or any supplies. Work by yourself and do your best. If a question is hard, skip it and come back. You may read the words out loud to yourself.

Start Notice & Wonder 5 min

Think about a grassy meadow with animals living in it.

1 In a meadow you might see **grass**, a **grasshopper**, a **mouse**, a **hawk**, and an **owl**. Write **one thing you notice** about what eats what.

2 Write **one thing you wonder**. Start with the words "**I wonder...**"

Build Read the Science 5–10 min

How energy moves in a food web

Every living thing needs **energy** to grow and move. In a meadow, that energy starts with the **Sun**.

- **Producers** make their own food using sunlight. Plants like **grass** are producers. They are the start of the food.
- **Consumers** cannot make their own food, so they **eat** other living things. A grasshopper, a mouse, and a hawk are consumers.
- **Decomposers** break down dead plants and animals and put nutrients back into the soil. A **mushroom** and an **earthworm** are decomposers.

A **food web** is a picture that shows what eats what. In a food web we draw **arrows**. An arrow means "**energy goes to.**" The arrow points **from** the thing that is eaten **to** the thing that eats it.

grass → **grasshopper** means "energy goes **from** the grass **to** the grasshopper that eats it."

Tip: the arrow always points the same way the energy travels — toward the eater.

Word Bank

producer

a living thing that makes its own food from sunlight, like a plant.

consumer

a living thing that eats other living things for energy.

decomposer

a living thing that breaks down dead plants and animals.

energy

what a living thing needs to grow and move.
 food web
 a picture with arrows that shows what eats what.

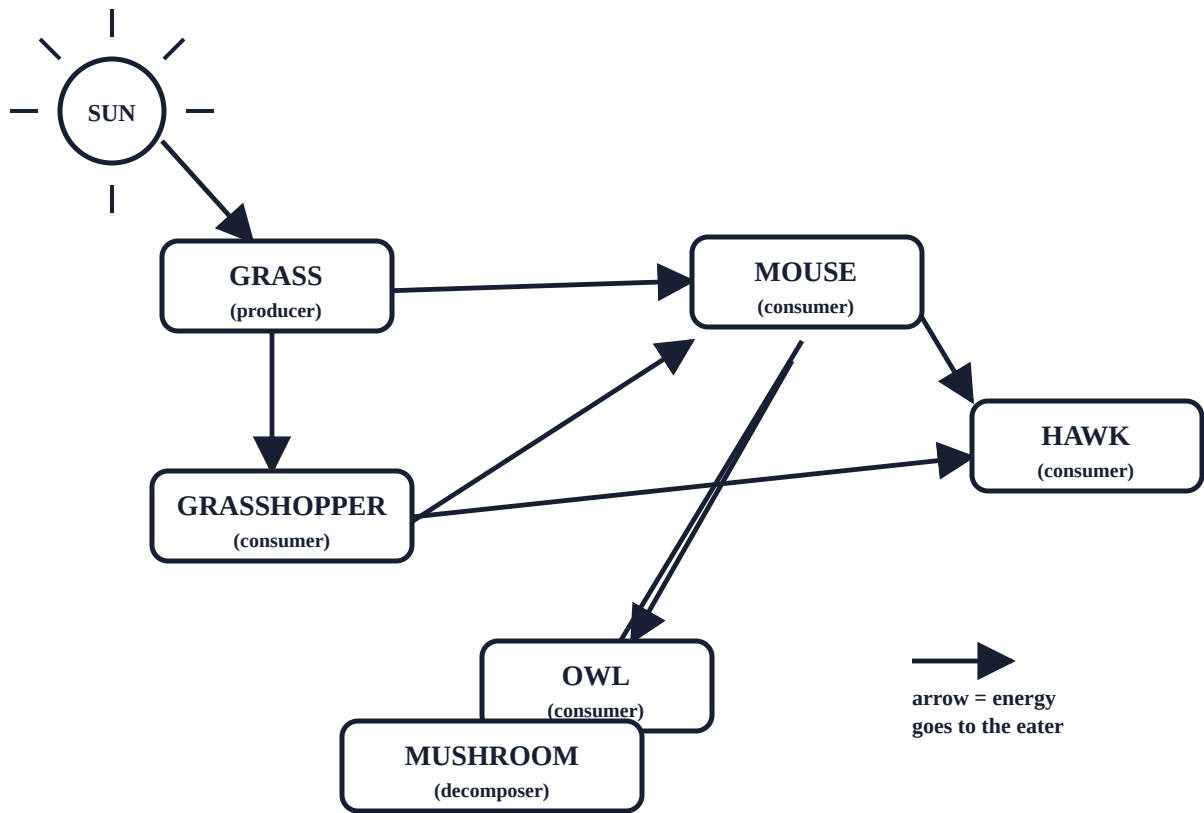


Figure 1. A meadow food web. Each **arrow** points **from** the living thing that is eaten **to** the one that eats it, showing which way the **energy** travels. The drawing is black and white, so it is clear without color.

3Look at Figure 1. The arrow from **grass** to **grasshopper** means the energy goes which way? Fill in the blank: energy goes from the _____ to the _____.

Apply Use the Food Web 20 min

Use Figure 1 on the page before to answer these questions.

4**Label each living thing.** Write **P** for producer, **C** for consumer, or **D** for decomposer.

- ___ a) Grass
- ___ b) Grasshopper
- ___ c) Mouse
- ___ d) Hawk
- ___ e) Mushroom

5**Trace one energy path.** Follow the arrows to write one **food chain** that is inside the web. Start with the Sun and use three more living things. Write them in order with arrows.

Sun → _____ → _____ → _____

6What if? Imagine all the **grass** in the meadow dries up and is gone. What do you think happens to the **grasshopper**? Use the food web to explain **why**.

7Observation or inference? An **observation** is something you see. An **inference** is an idea you figure out. Write **O** or **I** for each.

- _____ a) In the food web there is an arrow from the mouse to the hawk.
- _____ b) The hawk gets some of its energy from the mouse.
- _____ c) The mushroom grows on the dead mouse.

Explain Claim–Evidence–Reasoning 5–10 min

Question 8. A sickness makes **all the mice** in the meadow disappear. Predict what happens to the **hawk**. Use the food web as your evidence.

Sentence starters you may use: "I think the hawk will..." · "In the food web I see an arrow from..." · "This will happen because..."

Claim (what happens to the hawk)

Evidence (an arrow from the food web)

Reasoning (why that happens)

Close ACE Wrap-Up 5 min

Articulate

In your own words, what does an arrow in a food web mean?

Connect

Point to one producer and one consumer in Figure 1. Write their names.

Extend

Where does the energy in this whole food web first come from?

Continue Early Finisher optional · ~15 min

If you finish early (no new supplies needed):

Add a new living thing to the web. On the back of this page, draw a **rabbit** and add it to the meadow food web. Draw the **arrows** that show its energy. Think: **What does the rabbit eat?** and **What might eat the rabbit?** Remember, each arrow points toward the eater. Label the rabbit as a producer, consumer, or decomposer.

Turn in: Hand in this whole packet with your name, class, and date filled in. Make sure questions 1–8 and the ACE box are answered. The early-finisher drawing is optional — turn it in too if you did it.

G04_SCI_FoodWebs_01 — Food Webs and Energy Flow Student Packet



TEACHER ANSWER KEY FOLLOWS

Do not copy the pages after this divider for students.

Answer Key: Food Webs and Energy Flow

Grade: 4 **Subject:** Science **For teacher use only** Science

How to use this key

Answers are grouped by section and question number. Many items are open-ended; accept any response that shows correct thinking even if the wording differs. Notes flag where more than one answer is defensible and list common misconceptions to watch for. Estimated grading time: ~4–6 min per packet.

Start Notice & Wonder grade for effort · ~1 min

1 Notice — what eats what in the meadow.

Full credit for any reasonable observation about eating. **Samples:** "the hawk eats the mouse," "the grasshopper eats grass," "some animals eat other animals." Any on-topic notice is fine.

2 Wonder — an "I wonder..." question.

Accept any honest wonder that starts with "I wonder." **Samples:** "I wonder what happens if the grass dies," "I wonder what the owl eats." No wrong answers here.

Build Read the Science ~1 min

3 Which way the grass → grasshopper arrow points.

Energy goes from the **grass** to the **grasshopper**. The arrow points toward the eater (the grasshopper), because the grasshopper eats the grass and gets its energy. Accept any answer that puts grass first and grasshopper second.

Apply Use the Food Web ~2 min

4 Label: Producer (P), Consumer (C), Decomposer (D).

- a) Grass — **P** (makes its own food from sunlight).
- b) Grasshopper — **C** (eats grass).
- c) Mouse — **C** (eats grass and grasshoppers).
- d) Hawk — **C** (eats the mouse and grasshopper).
- e) Mushroom — **D** (breaks down the dead mouse).

5 Trace one energy path (a food chain in the web).

Intended path: Sun → grass → grasshopper → mouse.

Defensible alternates (any path that follows real arrows in Figure 1):

- Sun → grass → mouse → hawk
- Sun → grass → grasshopper → hawk
- Sun → grass → mouse → owl

Full credit for any chain that starts with the Sun, then grass (the producer), and follows arrows in the eaten-to-eater direction. Mark wrong any chain that runs an arrow backwards (e.g., "hawk → mouse").

6 What if all the grass is gone? Effect on the grasshopper.

The **grasshopper** would have **less food and could starve, so its numbers would drop**. Reasoning: the food web shows an arrow from grass → grasshopper, so the grass is the grasshopper's energy source. With no grass, the grasshopper loses that energy. Accept "the grasshopper would die / go hungry / leave to find food / there would be fewer grasshoppers" as long as the reasoning ties back to grass being its food (its arrow).

7 Observation (O) vs. Inference (I).

a) **O** — you can see the arrow drawn in the food web.

b) **I** — a reasoned idea; the arrow lets you conclude energy flows to the hawk, but you do not see the energy itself.

c) **O** — you can see the mushroom growing on the mouse.

Observation = seen directly; inference = an idea you figure out from evidence.

Explain CER (Q8) ~1–2 min

8 Predict what happens to the hawk if all the mice disappear.

Model answer. Claim: The hawk will have **less food and may go hungry, so there will be fewer hawks**.

Evidence: The food web shows an **arrow from the mouse to the hawk** (energy goes from mouse to hawk).

Reasoning: The mouse is one of the hawk's foods, so if the mice are gone the hawk loses that energy source.

*Strong answers may add that the hawk could survive by eating **more grasshoppers** instead, since the web also shows an arrow from grasshopper → hawk. Accept this as a correct, higher-level prediction.*

Grade for a prediction backed by a real arrow from the web and sound reasoning, not for wording.

CER scoring rubric (3 points)

Score	Claim	Evidence	Reasoning
3	Predicts a sensible effect on the hawk.	Cites a real arrow from the food web (mouse → hawk).	Clearly explains why losing the mice affects the hawk's energy.
2	Prediction is mostly correct.	Evidence is close but vague or not from the web.	Some correct why, but incomplete.
1	Prediction is vague or off.	Little or off-topic evidence.	Little or unclear reasoning.
0	No/incorrect prediction.	No evidence.	No reasoning.

Close ACE ~1 min

ACE Articulate / Connect / Extend.

Articulate: an arrow means "energy goes to" — it points from the living thing that is eaten to the one that eats it. Accept any plain-language version.

Connect: producer = **grass**; consumer = any of **grasshopper, mouse, hawk, owl**. Accept any correct pair.

Extend: the energy first comes from the **Sun**. (The grass is a producer, but it uses the Sun's energy to make food.)

Watch Common misconceptions

- **Arrows drawn backwards.** Students often think the arrow points from the eater to its food ("hawk → mouse" to mean the hawk eats the mouse). It is the other way: the arrow points from the food to the eater because it shows where the **energy goes** (mouse → hawk).
- **"The Sun is a consumer."** The Sun is not alive and does not eat — it is the energy **source**. Only the producer (grass) makes food; the Sun gives it the energy to do so.
- **"Removing one thing changes nothing."** Everything in a web is connected. Remove the grass and the grasshopper and mouse lose food; remove the mice and the hawk and owl lose a food source. A change to one part can affect many others.
- **Producer vs. consumer mix-up (Q4).** Watch for students calling the grass a consumer. Producers make their own food; consumers eat.
- **Observation vs. inference (Q7).** Students may mark a figured-out idea (like "the hawk gets energy from the mouse") as something they saw. If you cannot see it directly, it is usually an inference.

Teacher follow-up based on likely errors

If many students draw or read arrows backwards, re-anchor with "the arrow follows the energy, so it points to the eater." If students say the Sun is a consumer, review that the Sun is not alive and only producers make food. If Q6/Q8 answers say "nothing happens," show how one missing organism removes an arrow that others depend on. The backwards-arrow idea is the highest-value one to revisit next class.

G04_SCI_FoodWebs_01 — Food Webs and Energy Flow Teacher Answer Key