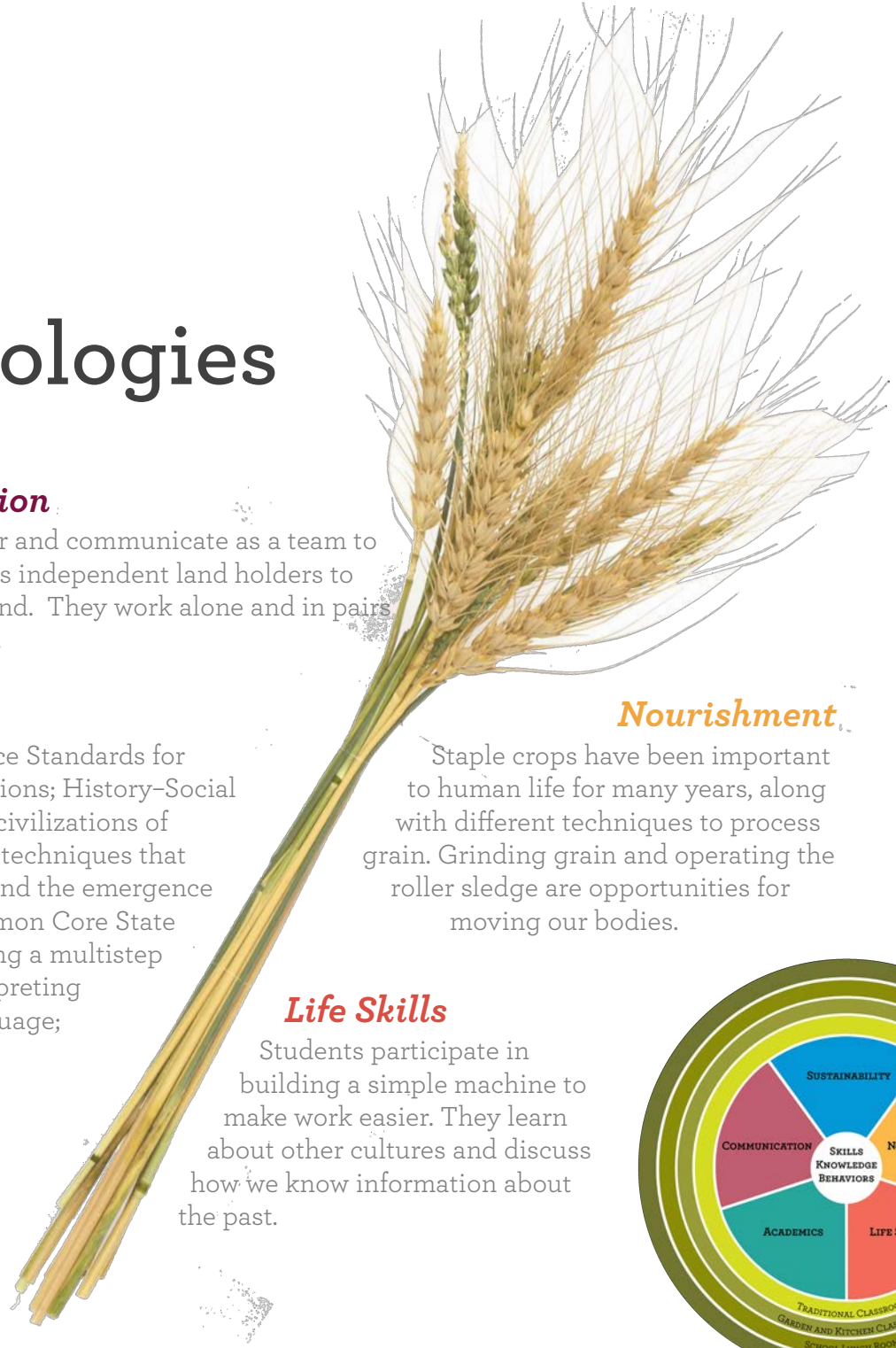
Garden Lesson G6-7

History Walk
Ancient Technologies



Communication

Students take on different roles, work together and communicate as a team to operate the roller sledge. They collaborate as independent land holders to supply water to their own and other people's land. They work alone and in pairs to grind grain.

Academics

This lesson fulfills Next Generation Science Standards for constructing explanations and designing solutions; History–Social Science Content Standards for the early civilizations of Mesopotamia, Egypt and Kush; agricultural techniques that permitted the production of economic surplus and the emergence of cities as centers of culture and power; Common Core State Standards for integrating information; following a multistep procedure; collaborative discussion; interpreting information; speaking and listening; language; and acquiring words and phrases.

Sustainability

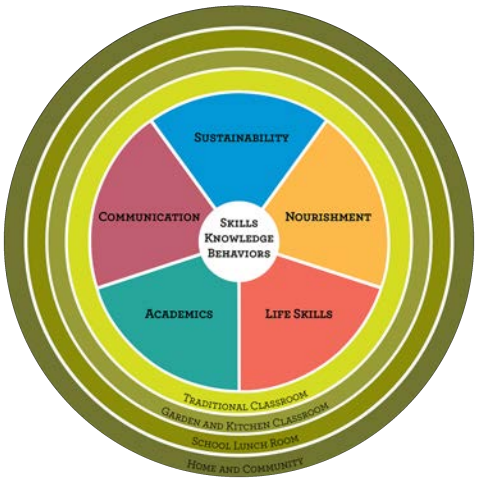
Different water management and irrigation technologies exist to manage seasonal rainfall, flooding and drought.

Nourishment

Staple crops have been important to human life for many years, along with different techniques to process grain. Grinding grain and operating the roller sledge are opportunities for moving our bodies.

Life Skills

Students participate in building a simple machine to make work easier. They learn about other cultures and discuss how we know information about the past.



Grade 6 Fall Rotation
Garden Lesson #7
G6-7

History Walk Abstract

Summary

In this 6th grade humanities lesson, students learn about ancient technologies from around the world by rotating through three stations in the garden: grain grinding, **roller sledge** and **irrigation**.

Objective

After this lesson, students will be able to:

- Relate the ancient technologies in this lesson to modern technologies

Assessment

During this lesson, students will:

- Give an example of a modern day technology that originated from one of these ancient technologies

Communication is strengthened by working as a team, in collaboration with a partner and alone. ***Sustainability*** is highlighted as students use different water management and **irrigation** systems in a simulated society. ***Nourishment*** is offered by movement activities and discussion of **staple crops** and processing technologies. ***Life Skills*** are sharpened as students build a simple machine to make work easier, learn about other cultures and discuss how we know information from the past.

Academics fulfill Next Generation Science Standards for constructing explanations and designing solutions; History–Social Science Content Standards for the early civilizations of Mesopotamia, Egypt and Kush; the development of agricultural techniques that permitted the production of economic surplus and the emergence of cities as centers of culture and power; Common Core State Standards for integrating information; following a multistep procedure; collaborative discussion; interpreting information; speaking and listening; language; and acquiring words and phrases. See **Connections to *Academic* Standards** below for details.

Edible Schoolyard curriculum emphasizes developing community and personal stewardship, along with skills that will help students navigate different situations throughout their lives; using **observation** and **awareness**; and acknowledging **water as a precious resource.**

This lesson follows the BEETLES Project's *Learning Cycle* (Invitation-> Exploration -> Concept Invention -> Application -> Reflection) and uses their *Discussion Routines* (Think-Pair-Share, Whip-Around). All are highlighted in *Green** with an asterisk for easy identification. See the documents BEETLES_Discussion_Routines.pdf and BEETLES_Learning_Cycle.pdf included in **Resources** below for more information. Games and activities from other sources are also identified in *Green*, without an asterisk.

Connections to *Academic* Standards

Next Generation Science Standards, Middle School

Science and Engineering Practices:

- Constructing Explanations and Designing Solutions
  - Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.
  - Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future. (MS-ESS2-2)
  - Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints.
  - Apply scientific ideas or principals to design an object, system, process or tool.

History–Social Science Content Standards for California Public Schools, Grade 6

- 6.2 Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of Mesopotamia, Egypt and Kush.
  - 6.2.1 Locate and describe the major river systems and discuss the physical settings that supported permanent settlement and early civilization
  - 6.2.2 Trace the development of agricultural techniques that permitted the production of economic surplus and the emergence of cities as centers of culture and power.
  - 6.2.5 Discuss the main features of Egyptian art and architecture.

Common Core State Standards, English Language Arts and Literacy, Grade 6

- RH.6.7 Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
- RI.6.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
- RST.6.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- RST.6.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
- SL.6.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher- led) with diverse partners on *grade 6 topics, texts, and issues,* building on others' ideas and expressing their own clearly.
    - SL.6.1.b Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
    - SL.6.1.c Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
    - SL.6.1.d Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.
- SL.6.2 Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
- SL.6.4 Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.
- SL.6.5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.
- SL.6.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 on page 53 for specific expectations.)
- L.6.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
    - L.6.1.a Ensure that pronouns are in the proper case (subjective, objective, possessive).
    - L.6.1.b Use all pronouns, including intensive pronouns (e.g., *myself, ourselves*) correctly.
    - L.6.1.c Recognize and correct inappropriate shifts in pronoun number and person.
    - L.6.1.d Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).
- L.6.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.
    - L.6.3.a Vary sentence patterns for meaning, reader/ listener interest, and style.

    - L.6.3.b Maintain consistency in style and tone.
- L.6.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Connections to *Edible Schoolyard* Standards

Edible Schoolyard 3.0

In the Edible Schoolyard Program

- 1.0 Students work with each other and teachers to develop community and personal stewardship, along with skills that will help them navigate different situations throughout their lives.
- 1.1.1 – 1.3.12 This lesson fulfills all Edible Schoolyard Program standards, numbers 1.1.1 through 1.3.12. See ***The Edible Schoolyard Berkeley Standards*** for details.

In the Garden Classroom

- Concepts 3.3.7 Use **observation** and **awareness** to explore, investigate and be inquisitive learners in the garden. The garden classroom provides the opportunity for students to tap into their inherent curiosity about the natural world, observe patterns and connections and understand cause and effect.
- Concepts 3.3.10 Acknowledge **water as a precious resource** that is intrinsic to all living organisms, explore methods of water conservation, and are encouraged to do the same in their own lives as well.

History Walk Lesson

Materials

For the Roller Sledge Station

- Roller Sledge Cards
- Grain Cards
- Wooden palette
- 8 wooden poles (8' long 2" diameter)
- Nylon rope (15' long)
- Gardening gloves

For the Grain Grinding Station

- Grain Cards
- Mortar and pestle
- Wheat stalks
- Bags for **threshing**
- Raw wheat berries
- Cooked wheat berries for tasting and serving spoon
- Grain grinding bicycle (optional)

For the Irrigation Station

- Trowels
- Elevated sand box at a slight slant
- Hose and elbow irrigation fitting
- Globe
- Wooden blocks
- Spade hoe and rake (For resetting the table.)
- Large bucket (For capturing released water.)

Before you Begin

Create the Roller Sledge Station

- Prepare the Roller Sledge Cards
- Collect all the materials and place them at the station
- Tie the rope to the palette securely at two corners so that there is a loop about 4-6 feet long for students to pull the sledge

Create the Grain Grinding Station

- Prepare the Grain Cards
- Cook wheat berries for tasting
- Collect all the materials and arrange them on a table

Create the Irrigation Station

- Collect all the materials and place them at the station
- Make an elevated sand box at a slight slant
- Connect the hose to the sand box

Timeline Overview

Total Duration: 90 minutes

1. *Invitation** (10 minutes)
2. *Exploration** (10 minutes)
3. *Concept Invention** (10 minutes)
4. *Application** (10 minutes)
5. *Concept Invention** (10 minutes)
6. *Application** (10 minutes)
7. *Concept Invention** (10 minutes)
8. *Application** (10 minutes)
9. *Reflection** (10 minutes)

Procedures

At the Opening Circle

(Use the word **comparable** in a sentence. "What ancient technologies are comparable to modern day technologies?")

1. *Invitation**: (10 minutes)
   Welcome students and introduce this history walk, which is about ancient technologies.

a. Tell students that they will rotate through three stations to learn about different types of ancient technologies from all over the world.
b. Point out each station and make sure students can see the set up materials, but don't name them or explain what they are.

2. *Exploration**: (10 minutes)
Investigate connections between ancient and modern technologies and introduce today's stations.
a. Invite students to share the ancient civilizations they have already learned about in their classroom.
b. Ask them if they think any of those civilizations will be represented today on the Ancient Technologies Walk, and what they think they will be doing at each one.
c. Introduce each station and briefly describe what will happen there.
i. Roller Sledge Station: students will demonstrate using an ancient tool that makes work more efficient.
ii. Grain Grinding Station: students will **thresh**, **winnow** and grind wheat or barley.
iii. Irrigation Station: Students will explore the technologies of **dams**, **levees**, **canals** and **reservoirs** using an elevated sand trey with a river running through it.
d. Ask students to think about modern day technologies that may have derived from the ancient technologies they will learn about in the walk.
e. Divide students into three groups and rotate the groups through each station.

At the Roller Sledge Station

3. *Concept Invention**: (10 minutes)
a. Ask students when the Egyptians built the pyramids and prompt them to think about how we know information about civilizations that lived 4 to 5 thousand years ago.
b. Show students the cards of workers building the pyramids using the **roller sledge** technique and invite them to share their observations.
c. Share the facts aloud that are on the back of the Roller Sledge Cards:
i. The Great Pyramid is outside of Cairo.
ii. It was built with 2.3 million stones.
iii. The average stone weighed 2.5 tons or the equivalent of an SUV.
iv. Some stones weighed as much as 16 tons or the equivalent of two full-grown elephants.
v. The great pyramid is 1½ football fields tall and 2½ football fields wide.
vi. It took 10-20 years to build under the Khufu pharaoh.

d. Explain that today's challenge is to move very heavy "rocks" from one location to another as a team using the **roller sledge**.
e. Assign students roles: pullers, wooden pole movers, and rocks (a non-speaking part).

4. *Application**: (10 minutes)
   a. Demonstrate how to safely hold the poles and emphasize safety:
      i. Rocks should always be in a sitting position with hands and feet away from the edge.
      ii. Polers should always wait until the pole is completely released before reaching for it.
   b. Ask the students to put on gloves and set up the **roller sledge** by placing half the poles parallel on the ground, roughly 2 feet apart, and placing the pallet on top.
   c. Ask the rocks to get on board and tell the pullers to pull slow and steady, making sure to give the pole movers enough time to move each pole from the back to the front as the pallet moves forward. Pole movers will have the remaining poles in hand at the ready.
   d. Once they have completed a successful test run, ask students if they're up for the challenge of putting more weight on the pallet and going up hill. When they accept the challenge, take all supplies to the bottom of the hill and begin the process again. Give students the option of switching roles at this time. Remind students that they are moving hundreds of pounds of weight up hill without motors or wheels!
   e. Increase the challenge if time permits (*up a steeper hill, a longer distance, more weight, fewer pullers*).
   f. When time is up, send students to the Irrigation Station.

At the Irrigation Station

5. *Concept Invention**: (10 minutes)
   a. Using a globe, ask students to find modern day Mesopotamia and to describe the climate and landscape of the region.
   b. Prompt students to think about the challenges of living where there are periods of drought and periods of flooding.
   c. Define **reservoir**, **levee**, **dam** and **canal**.
   d. Compare the landscape in the elevated sand box to Mesopotamia.

6. *Application**: (10 minutes)
   a. Give each student a plot to irrigate in the sandbox.
   b. Explain that each student is responsible for creating a system of **irrigation** that will move water from the main river to their plot using **reservoirs**, **canals**, **dams** and **levees**.

c. Tell students they need to allow water to flow to communities downstream.
d. Give each student one trowel and one wooden block.
e. Ask them to imagine that they are ancient Sumerians.
    i. Recreate a flood scenario with story telling and water flowing through the hose into the sandbox.
f. Give the students an opportunity to assess their **irrigation** system, make improvements and try again.
    i. Then ask students to discuss the improvements they made.
g. When time is up, send students to the Grain Grinding Station.

At the Grain Grinding Station

7. *Concept Invention**: (10 minutes)
    a. Ask students what a **staple crop** is, and ask them to give examples from around the world.
    b. Explain that wheat was one of the **staple crops** in Ancient Egypt.
    c. Show students the card with an image of a harvester, and ask them to describe what they see.
        i. Explain that in the image the person is harvesting and **threshing** grain.
    d. Hold up an example of a wheat stalk and ask if students know how wheat turns in to bread.
    e. Tell students that in this station they will process grains in 3 different ways.
    f. Show students the card with an image of someone using the mortar and pestle, and ask them to describe what they see.
        i. Explain that the person in the image is grinding grain.
        ii. Explain that today students will be using the mortar and pestle to grind wheat berries into flour.

8. *Application**: (10 minutes)
    a. Invite students to taste the cooked wheat berries.
    b. Ask a student to demonstrate using the mortar and pestle, reminding them to be gentle.
    c. Ask a student to demonstrate using the bag method to **thresh**, and how to use your breath to **winnow**.
    d. Explain that you will be choosing students two at a time to ride the grain-grinding bicycle.
    e. Divide students in to three groups and have them rotate through all three substations of the Grain Grinding Station.
    f. When time is up, send students to the Roller Sledge Station.

At the Closing Circle

9. *Reflection**: (10 minutes)
    a. Lead students in a brainstorm of the discussed technologies from the history walk.

b. Ask students to use the ***Think-Pair-Share**** process to reflect on today's lesson.
  i. Ask students to choose one of the stated technologies, turn to a neighbor and connect it to a modern day technology.
  ii. Invite students to share what they discussed with their partner with the group.

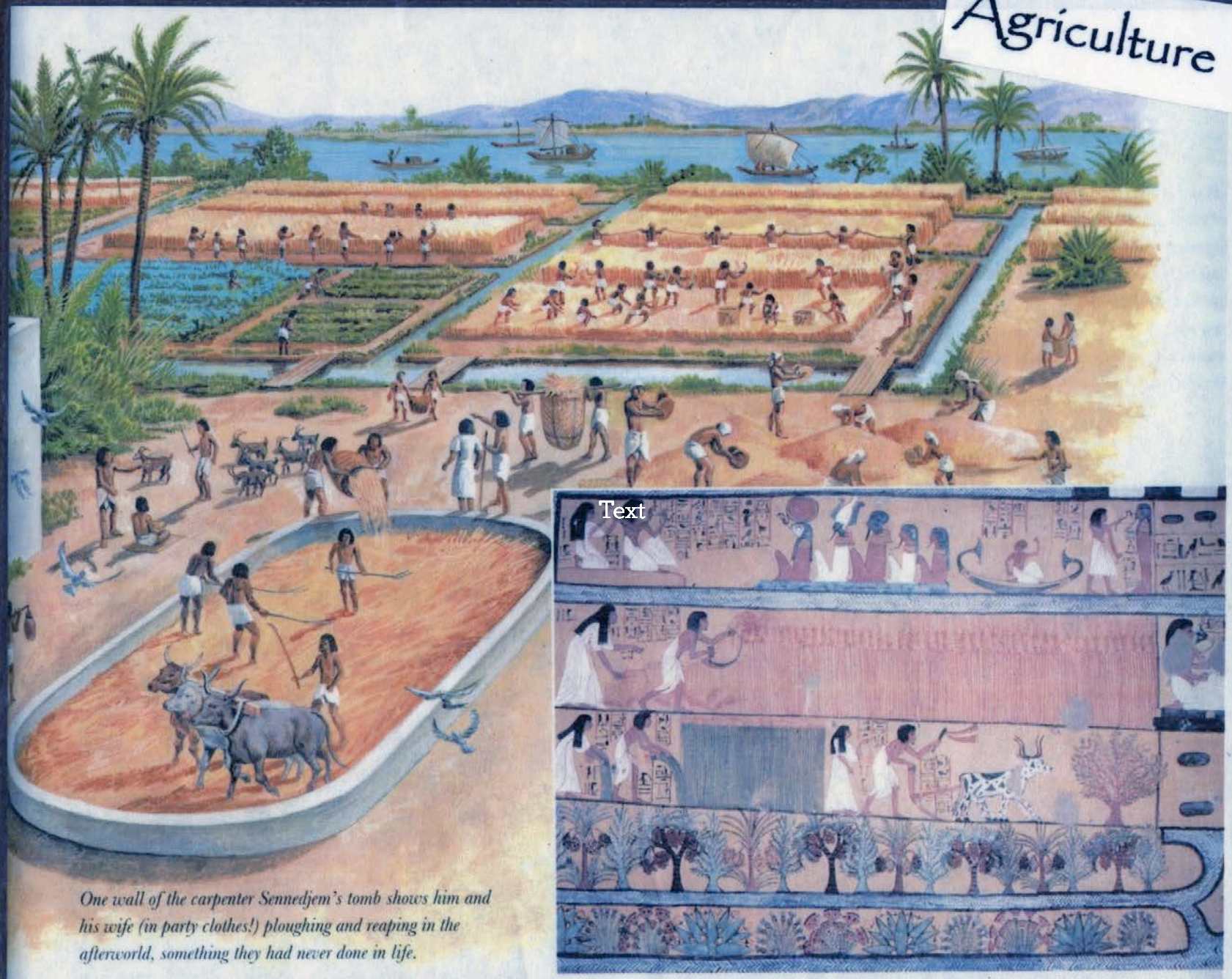
c. To use ***Think-Pair-Share****:
  i. Think - Give students an interesting broad question to think or write about briefly.
  ii. Pair - Pair students, and ask them to discuss the question(s) with their partner.
  iii. Share - Students share their discussion ideas with another pair of students or the instructor leads a whole group discussion about the topic.

Vocabulary
Thresh
Winnow
Chaff
Staple crop
Roller sledge
Irrigation
Reservoir
Levee
Dam
Canal

Contributors
All lessons at the Edible Schoolyard Berkeley are developed in collaboration with the teachers and staff of the Edible Schoolyard and Martin Luther King Jr. Middle School.

Resources
G6-7_Grain_Cards.pdf
G6-7_ Roller_Sledge_Cards.pdf

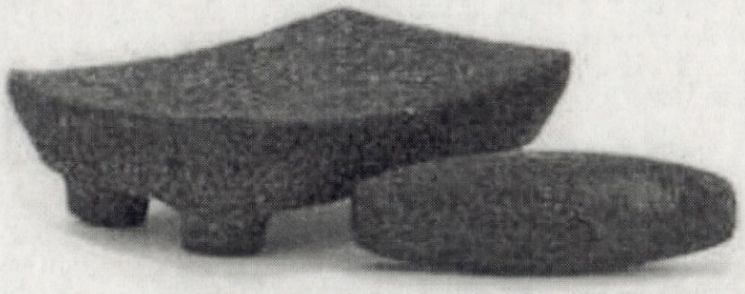
Agriculture



Text

One wall of the carpenter Sennedjem's tomb shows him and his wife (in party clothes!) ploughing and reaping in the afterworld, something they had never done in life.

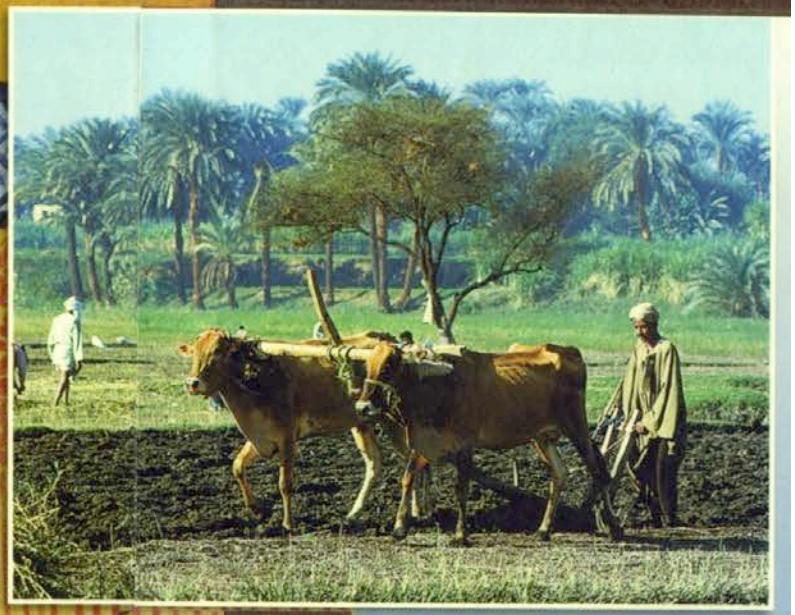
This statuette shows a woman grinding grain into flour using a grindstone on an oval slab. It is from the Pyramid district of Gîza, 6th Dynasty, c. 2200 B. C.



similar "mortar and pestle"

G6-7_Grain_Cards.pdf

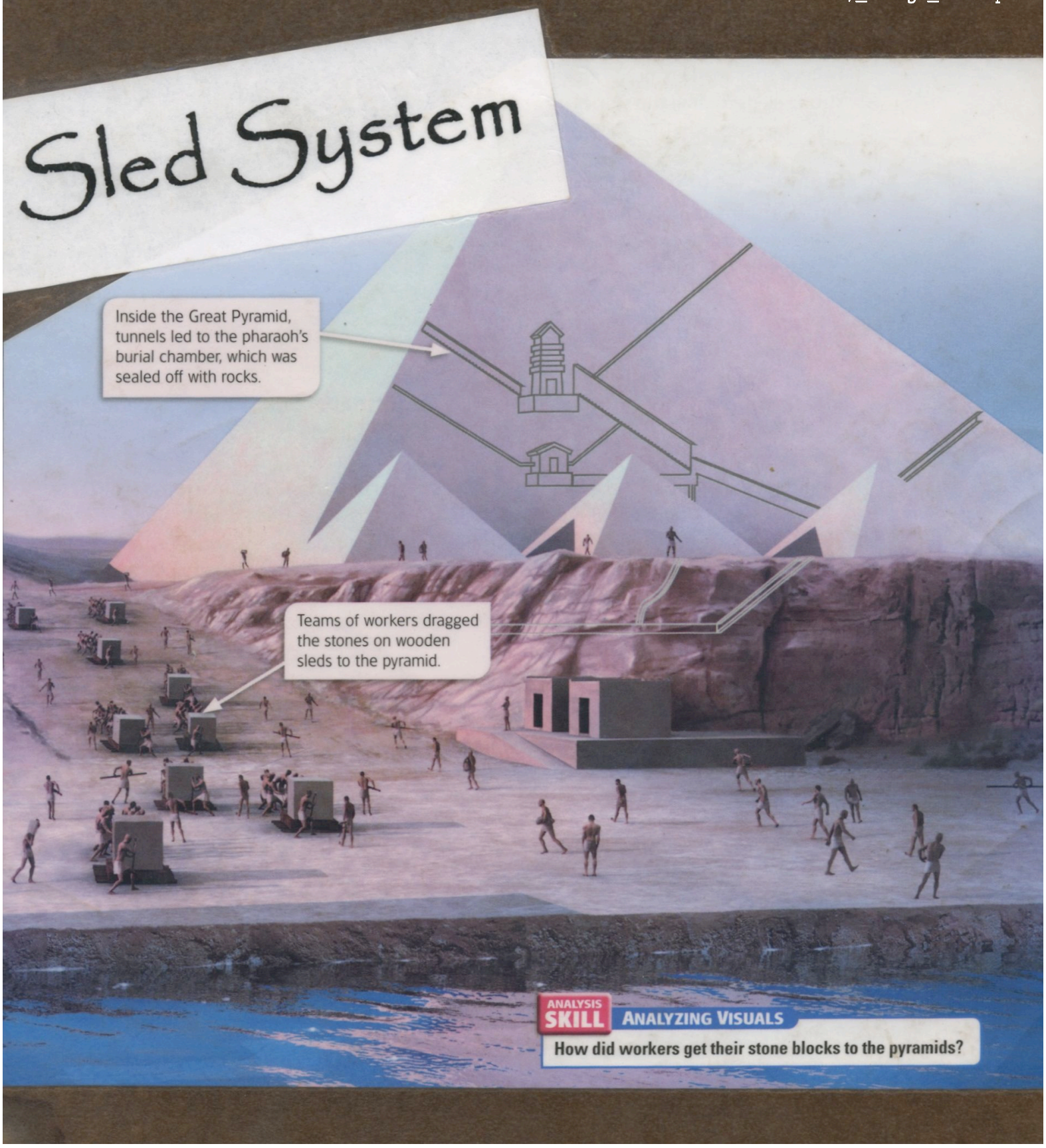
Farming in Egypt



Farmers in ancient Egypt learned how to grow wheat and barley. This tomb painting shows a couple harvesting their crop (left). Farmers in Egypt still use the fertile lands along the Nile River to grow food (above).

G6-7_Sledge_Cards.pdf

Sled System

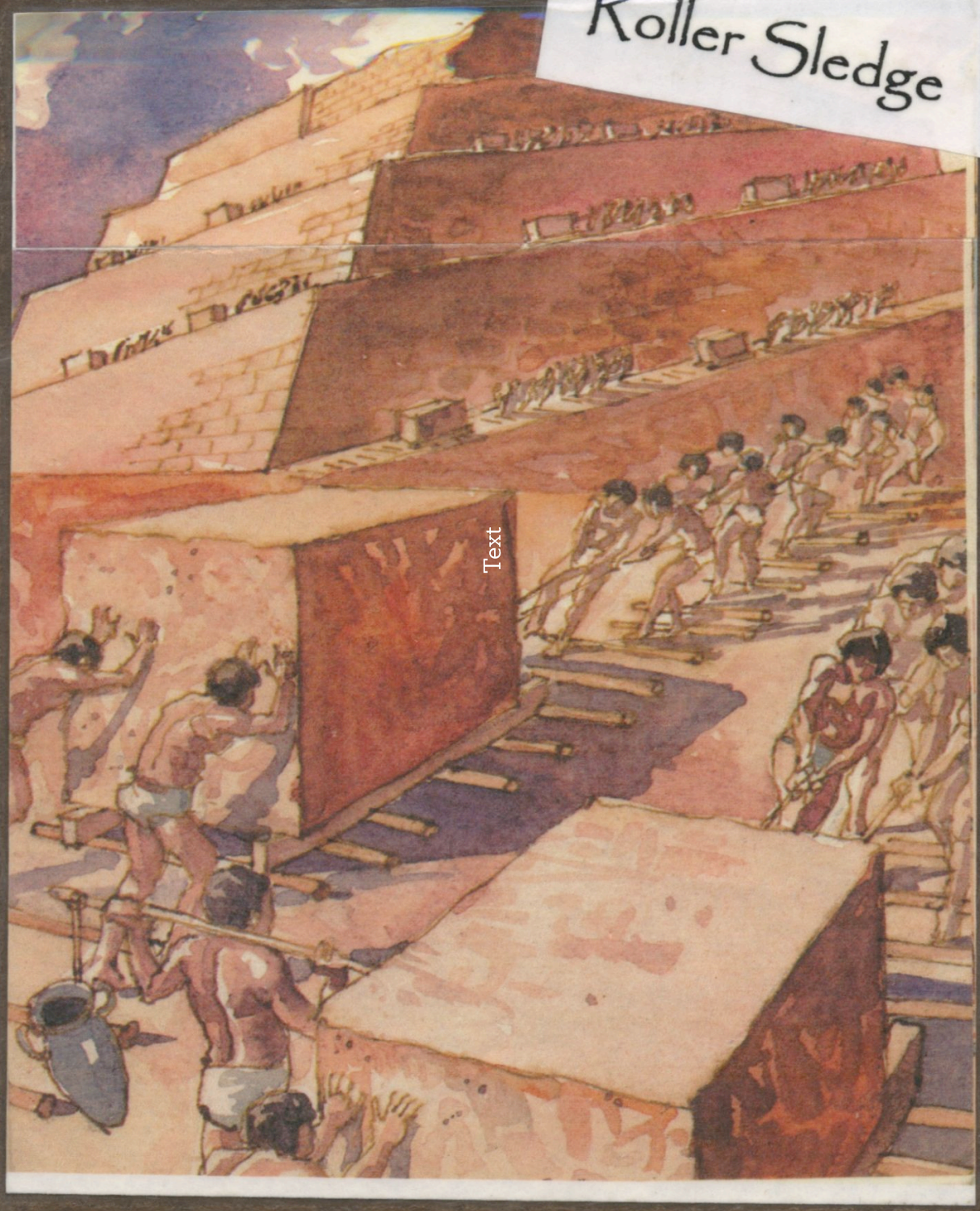


ANALYSIS SKILL **ANALYZING VISUALS**

How did workers get their stone blocks to the pyramids?

G6-7_Sledge_Cards.pdf

Roller Sledge



Text

1. The Great Pyramid is outside of Cairo.

2. It was built with 2.3 million stones.

3. The average stone weighed 2.5 tons or the equivalent of an SUV.

4. Some stones weighed as much as 16 tons or the equivalent of two full grown elephants.

5. The great pyramid is 1 ½ football fields tall and 2 ½ football fields wide.

6. It took 10-20 years to build under the Khufu pharaoh.