

Pea Trellis STEM Design Challenge (Grades 3-5)

OVERVIEW: In this STEM design challenge, students will work in small groups to design and build a trellis to support pea vines in an outdoor garden. This lesson can be paired with the book *First Peas to the Table*, by Susan Grigsby. In this story, a class of students copy the annual contest Thomas Jefferson had with his neighbors to see who could grow the first bowl of peas.



OBJECTIVES: The student will be able to:

- Design a trellis for pea plants based on criteria provided.
- Compare multiple trellis designs and with a group design a trellis based on criteria provided.
- Build the trellis with a group based on the design selected.
- Evaluate the group's trellis based on the criteria provided.

GRADES: 3-5

INTRODUCTION:

Instead of spending money on store-bought trellises for your pea plants, give your students this STEM challenge and have them build their own. You can plant pea seeds under the completed trellises or transplant pea plants started indoors.

BACKGROUND:

Plants grow in many different ways. Some plants can grow a sturdy stem that will hold them upright. Some plants are what we call vines. These plants have a very thin stem and need support from something strong and tall. In nature, vines often grow up trees. In a field, farmers will use a man-made structure called a trellis to support the growing vine. The vine will grow up the trellis, often twisting around the trellis as it grows.

PROCEDURE:

Divide the students into groups of four. Distribute the design challenge rubric sheets. Explain and review the criteria with the class and answer questions. Explain and review the challenge rules. Explain and review the time schedule. Tell students that you will be observing their progress and reminding them to stick to the challenge criteria, rules, and time requirements.

CRITERIA:

- Your trellis must be at least 24 inches tall.
- Your trellis must be at least 12 inches wide.
- Your trellis must stand upright to support the pea vine and not fall over.
- Your trellis must include string or yarn for the pea vine to cling to.

MATERIALS:

Pea seeds	Tree branches	Dowel sticks
Thin pieces of wood	Yarn	String

Before the challenge, you might ask students to brainstorm and search at home for other materials that could be used to make a trellis such as: rulers, yardsticks, broomsticks, etc.

CHALLENGE RULES:

- Listen carefully to ideas from everyone on your team. Decide on the best design before you begin to build.
- You may only use the materials provided. You do not have to use all the materials provided.
- You must build your trellis in the time provided.
- You may use additional tools such as scissors and rulers.

TIME SCHEDULE:

Teacher will set a timer and notify students when to move on to the next step.

- 5 minutes for each student to sketch his/her own design.
- 5 minutes to brainstorm ideas as a group.
- 10 minutes to plan out the design.
- 20 minutes to create the product (the trellis).
- 10 minutes to reflect. How can we improve the design? What worked well? What did not work well?

EXTENSIONS:

Show students pictures of trellises used in farms and gardens today. If you are pairing the lesson with the book *First Peas to the Table*, show the students pictures of trellises from Thomas Jefferson's garden.

What other vegetables grow on vines and need trellises? Discuss with the class or have them research how their favorite vegetables and fruits grow.

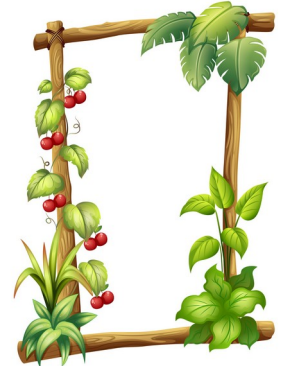
New Jersey Learning Standards:

Science: 3-5:ETS1.A,B,C

NAME _____

PEA TRELLIS DESIGN CHALLENGE RUBRIC

Today your challenge is to design and build a trellis for the pea vines in our garden to grow on. You will have only 40 minutes to do this project.



CRITERIA:

- Your trellis must be at least 24 inches tall.
- Your trellis must be at least 12 inches wide.
- Your trellis must stand upright to support the pea vine, and not fall over.
- Your trellis must include string or yarn for the pea vine to cling to.

CHALLENGE RULES:

- Listen carefully to ideas from everyone on your team. Decide on the best design before you begin to build.
- You may only use the materials provided
- You must build your trellis in the time provided
- You may use additional tools such as scissors and rulers

To evaluate your trellis, circle how you met each specification below.

CRITERIA	3	2	1
Our trellis is at least 24 inches tall.	Yes!	Almost	Not really
Our trellis is at least 12 inches wide.	Yes!	Almost	Not really
Our trellis stands upright.	Yes!	A little unsteady	Not really
Our trellis includes string or yarn.	Yes!	Just a little	Not really
Original and creative	Impressive design	Unique design	Interesting design
Used materials on list only	Yes!	Some	Used a material not on the list