

Test 3-2A: Building an Algebraic Model and Making Predictions

The NYC parks department does a 15-year-long experiment to investigate the health of trees in different areas. They planted three oak trees, and measured the height of each tree as the years pass.

Time (years)	Height (meters)
3	2.0
3	2.3
3	2.5
9	3.7
9	4.0
9	4.2
15	5.5
15	6
15	6.1

The independent variable is the **time** since planting, measured in *units of years*.

The dependent variable is **height**, measured in *units of meters*.



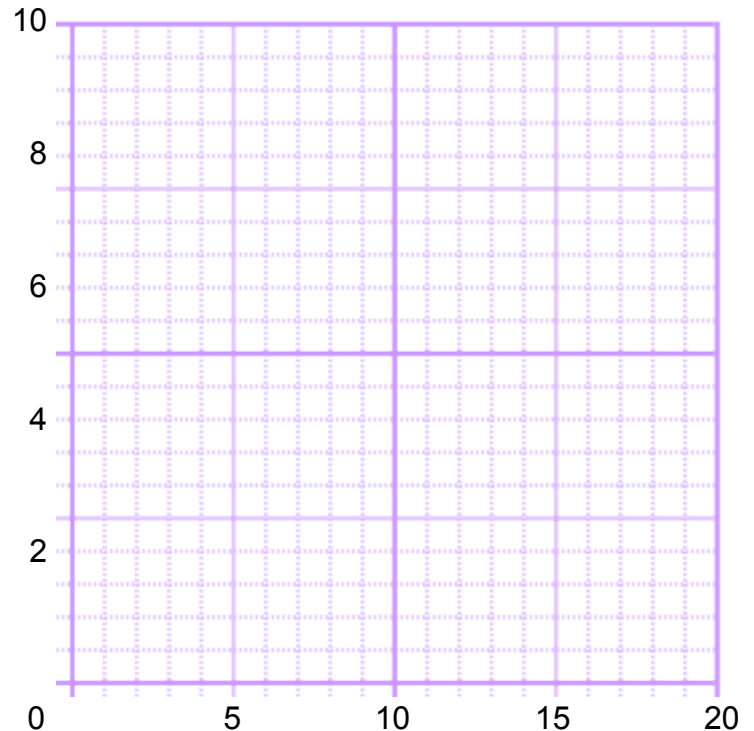
CONNECT
Skill 1b

EA 4
EA 6

a. Add to the graph anything that's missing to make it complete.

b. **USE A STRAIGHT EDGE** to draw a **trend line** to identify a pattern in the data.

c. **Calculate the slope of your trend line.** SHOW ALL WORK, WITH UNITS.



CONNECT
Skill 2b
Skill 2d
Skill 2e
Skill 2f

EA 15
EA 10

d. Write a **slope statement** to interpret the meaning of the slope of your trend line.



CONNECT
Skill 2g

EA 14



CONNECT
Skill 2f

EA 16

e. The trees had already grown some before they were planted in the park, so we need to consider this "initial height."

Use your trend line to **predict one value for height at time = 0** : _____



CONNECT
Skill 2h

EA 17

f. Use " $y=mx+b$ " with correct variables to **construct an algebraic model** (with units) that could be used to make predictions about time and height.

g. **Use your algebraic model to predict a value for height when time = 10 yrs.**
SHOW ALL WORK WITH UNITS.

HINT: You can *check* your work with the graph, but if you don't use algebra you won't get credit for the algebra skills.



CONNECT
Skill 2b
Skill 2d
Skill 2h

EA 17

h. Predict a value for the time that the trees will reach a height of about 10 meters tall, assuming the pattern continues.

Skill Feedback: Use feedback on each skill to help you learn from your mistakes.

☐

1b I can graph data on graph paper, making sure that my axes are labeled & scaled appropriately and the graph has a useful title.

☐

2b I always use correct units when working with numerical values.

☐

2d I use algebra correctly when solving problems, first writing a general form then substituting specific values.

☐

2e I use a reasonable number of decimal places, and write answers as a decimal not a fraction.

☐

2f I can create a linear trend line by hand to show a pattern in a set of data. I can calculate the value of the slope & intercept of this line.

☐

2g If the slope of a trend line has physical meaning, I can write a "slope statement" expressing the meaning of that slope.

☐

2h I can construct an algebraic model from a linear trend line and use it to make predictions.