



## EduTrend Contents

EDUTECH · STEM RESOURCES FOR TEACHERS · MIDDLE SCHOOL

# Slider Detectives

Explore straight-line graphs with sliders in a free graphing tool

Ages 12–14

Level: Intermediate

60 minutes

Pairs · up to 30

Activity 04

Inside: activity at a glance · step-by-step session plan · facilitator notes · 3 student worksheets · assessment checklist

## ACTIVITY 04 · AT A GLANCE

# Slider Detectives

The teacher shows  $y = mx + c$  with sliders on a free graphing tool. Pairs predict what will happen when  $m$  or  $c$  changes, then test on their own devices. They record observations, write rules for gradient and intercept, and finish with a matching challenge: equations to graphs without the tool, then check.

## Learning outcomes

By the end of the session students can:

- predict graph changes;
- explain gradient and intercept;
- match equations to graphs;
- use technology to test conjectures.

**KEY WORDS**

gradient · intercept · slider · linear · parallel · steepness

**CURRICULUM LINKS**

Science: speed–time graphs.  
Geography: slopes. Computing: parameters.

**1****QUESTION**

What will we find out?

**2****PREDICT**

What do we expect?

**3****EXPLORE**

Use the resource

**4****RECORD**

Capture evidence

**5****EXPLAIN**

What did we learn?

**6****EXTEND**

Where next?

## Materials (per pair)

- Devices with a browser
- A free graphing tool such as Desmos or GeoGebra
- Graph matching cards
- Worksheets 1, 2 and 3

## Before the session

- Prepare a slider graph.
- Test on devices.
- Print matching cards.
- Print worksheets.

**SAFETY**

Follow school internet policy. No accounts are needed to use the graphing calculator.

## ACTIVITY 04 · SESSION PLAN

# Step by step

Show the whole class first, then let pairs repeat the exploration on their own devices.

| Time                 | What happens                         | Say or ask                                             |
|----------------------|--------------------------------------|--------------------------------------------------------|
| 0–10 min<br>Demo     | Teacher moves the $c$ slider.        | <i>“What do you notice?”</i>                           |
| 10–30 min<br>Explore | Pairs predict and test $m$ and $c$ . | <i>“What happens when <math>m</math> is negative?”</i> |
| 30–40 min<br>Rules   | Write rules.                         | <i>“How do you know?”</i>                              |
| 40–55 min<br>Match   | Match cards without the tool.        | <i>“Which is steepest?”</i>                            |
| 55–60 min<br>Check   | Check with the tool.                 | <i>“Were you right?”</i>                               |

**CHALLENGE CARD (print or copy onto the board)**

Use sliders to discover how  $m$  and  $c$  change a straight-line graph, write rules for each and match equations to graphs without technology.

## ACTIVITY 04 · FACILITATOR NOTES

# The teaching know-how in brief

In  $y = mx + c$ ,  $m$  is the gradient: how much  $y$  increases when  $x$  increases by 1. A larger  $m$  gives a steeper line; a negative  $m$  slopes downwards.  $c$  is where the line crosses the  $y$ -axis.

Lines with the same  $m$  are parallel. Dynamic graphing tools let students test many cases quickly, but they still need to explain why the pattern holds.

## Common ideas to listen for

- “ $c$  changes the steepness.” It moves the line up or down.
- “A negative gradient is less steep.” It slopes the other way.
- “The tool proves it.” Explanation is still needed.

## Adapting the activity

### Support

Start with  $c$  only.

### Stretch

Explore  $y = ax^2 + c$  with sliders.

WORKSHEET 1

# Predictions and tests

Name: \_\_\_\_\_

Class: \_\_\_\_\_ Date: \_\_\_\_\_

Predict, then test.

## Predictions and tests

| Change     | Prediction | What happened |
|------------|------------|---------------|
| m bigger   |            |               |
| m negative |            |               |
| c bigger   |            |               |
| c negative |            |               |

**WORKSHEET 2**

# Rules

Write your rules.

## Rules

| Letter         | Rule |
|----------------|------|
| m              |      |
| c              |      |
| Parallel lines |      |

## WORKSHEET 3

# Matching

Explain one match.

## How we matched an equation to its graph

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## FOR THE TEACHER

# Assessment checklist

Use during the session. One sheet covers up to eight students; copy as needed.

| Student | Predicts changes | States rules | Matches without the tool |
|---------|------------------|--------------|--------------------------|
|         |                  |              |                          |
|         |                  |              |                          |
|         |                  |              |                          |
|         |                  |              |                          |
|         |                  |              |                          |
|         |                  |              |                          |
|         |                  |              |                          |

Suggested codes: W = working towards · E = expected · G = greater depth

## ABOUT THIS ACTIVITY

Slider Detectives is a sample activity from the EduTrend Contents Edutech STEM Resources for Teachers programme (middle school, level: intermediate). Every activity in the programme follows the same format: a practical challenge, a clear session plan, facilitator notes and ready-to-print worksheets, so that teachers, club leaders and parents can run it without extra preparation.

Full 15-, 20- and 32-week programmes are available from EduStore at [edutrend.org](https://edutrend.org).

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