

EduTrend Contents

G4C · STRATEGY GAMES · MIDDLE SCHOOL

Nim Detectives

Crack the winning strategy for take-away games by working backwards, then test it on new rules

Ages 11–13	Level: Intermediate	40 minutes	Pairs · up to 30	Activity 03

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

ACTIVITY 03 · AT A GLANCE

Nim Detectives

Pairs play the take-away game: 1, 2 or 3 counters per turn, last counter wins. They record positions and work backwards from the end: which numbers left for your opponent guarantee a win? Pairs state a rule, test it, then change the game, such as taking 1 to 4, and predict the new winning positions before testing.

Learning outcomes

By the end of the session students can:

- work backwards;
- identify winning positions;
- generalise a rule;
- test predictions.

KEY WORDS

work backwards · winning position · generalise · rule · test · predict

CURRICULUM LINKS

Maths: patterns, multiples and reasoning.

1	2	3	4	5	6
WARM UP	**EXPLAIN**	**PLAN**	**PLAY**	**REPLAY**	**CLOSE**
Minds ready	One game, clear rules	Think ahead	Predict your opponent	What else could you try?	Shake hands

Materials (per pair)

- Counters
- Recording tables
- Worksheets 1, 2 and 3

Before the session

- Prepare counters.
- Model working backwards.
- Print tables.
- Plan pairs.

SAFETY

Keep competition friendly; the goal is discovery.

ACTIVITY 03 · SESSION PLAN

Step by step

Working backwards from the end is a powerful general strategy.

Time	What happens	Say or ask
0–5 min **Warm up**	Play two quick rounds.	*"Is it luck?"*
5–10 min **Explain**	Work backwards from 1 counter.	*"Who wins with 4 left?"*
10–32 min **Investigate**	Find winning positions; test changes.	*"What is the rule?"*
32–40 min **Share**	Present rules.	*"Does it always work?"*

CHALLENGE CARD (print or copy onto the board)

State a winning rule and predict how it changes when the rules change.

ACTIVITY 03 · FACILITATOR NOTES

The strategy game know-how in brief

Planning means holding a goal in mind and choosing steps towards it.

Flexibility means changing course when a prediction turns out wrong.

Common ideas to listen for

- “Strategy games are just talent.” Strategies can be found.
- “One example proves a rule.” Test many.
- “The rule never changes.” New rules need new strategies.

Adapting the activity

Support

Start with 10 counters and take 1 or 2.

Stretch

Explain why the rule works for any starting number.

WORKSHEET 1

Working backwards

Name: _____ Class: _____ Date: _____

Mark winning and losing positions.

Positions

Counters left	Win or lose for player to move?
1	
2	
3	
4	
5	
8	

WORKSHEET 2

New rules

Predict and test.

Rule change

Rule	Predicted winning positions	Tested?

WORKSHEET 3

Conclusion

Reflect.

Our winning rule is... because...

FOR THE TEACHER

Assessment checklist

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

Student	Works backwards	Generalises	Tests predictions

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

ABOUT THIS ACTIVITY

Nim Detectives is a sample activity from the EduTrend Contents G4C Strategy Games 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.

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