



Overview

In this session pupils draw on the knowledge, skills and understanding of the earlier pods in order to design a new game or new version of an existing game. Pupils work in groups to develop a strategy to complete this task within the time set and to the specified criteria. This game needs to have fair rules and an effective scoring system. Pupils reflect on their learning over the topic and consider how they can improve in the future.

In their final presentation, teams will need to show:

- that some equipment has been tested or improved
- that practice improves performance
- that the game has been improved through consultation with others.

The final presentation will be assessed against an additional set of criteria agreed by the class.

Pod 3 Game on

I = Information retrieval

C = Communication

T = Teamwork

M = Modelling

P = Planning

Lesson	Activity	Learning outcomes	Learning skills	Code
Lessons 1–5	1 What makes a great game?	Use an understanding of STEM to design a new game.	Agree criteria.	C, T
	2 Choosing the game		Construct an attributes analysis chart.	P, C, I, T
	3 The game plan		Use a chart to plan a project.	P, T
	4 Carrying out the project		Giving constructive feedback.	P, C, I, T
	5 Assessing the game		Evaluate a presentation.	I, C
	6 Talking a good game		Give a presentation.	C
	7 Well played		Reflect on learning.	I, C, T



Early decisions

STEM teachers need to consider a series of key issues before beginning the detailed planning for the summative task Game On.

Health and safety

Carry out your own risk assessment and take suitable precautions.

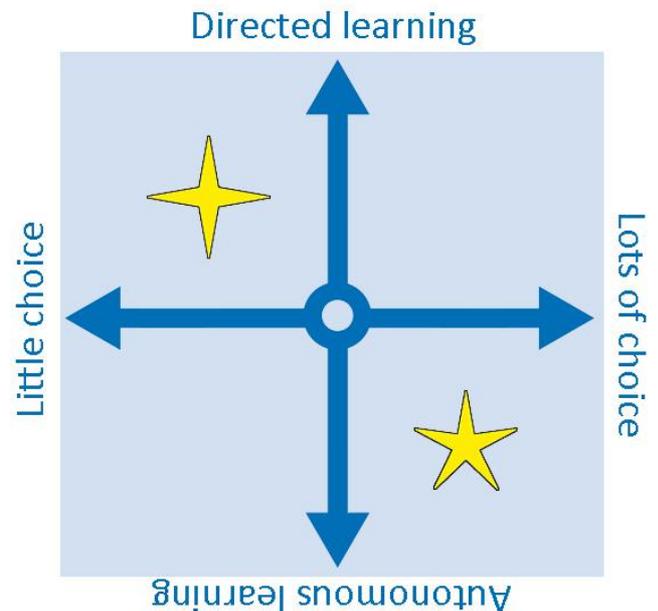
1. Choice and autonomy

Game on represents an excellent opportunity for pupils to engage in depth with a game or sport of their choice. It also allows pupils to set their own challenges and targets. There are risks involved in giving pupils more freedom than they are ready for. Make your own judgement depending on the particular group of pupils you have in front of you. The autonomy cross can help you decide what level of project work is appropriate for your class. You can limit pupils' choice by restricting the scope to indoor games, for instance. Direct the learning by presenting the challenge as a series of scaffolded tasks.

You may have a challenging group who have not yet tried an extended piece of project work. In this case, you may want to present a limited range of project options with a highly structured project plan.

You may have a very able group who have already taken part in extended projects. You can allow them freedom to choose their topic as well as freedom to decide how they will carry it out.

Autonomy cross



2. Timing of project work

There is usually more flexible curriculum time in the summer term after the exams. On the other hand the Games could be competing with more leisure-orientated activities that take place during this time of year. It would sit especially well in the period around a school games day.

3. Place and resources

Secure a dedicated room or rooms for the duration of the project. This is important to avoid having to move equipment around. Make the room feel novel by providing interesting and informative stimulus materials. Organise appropriate furniture and think about how you want the seating and the work spaces set out. You might allocate designated areas for particular tasks like video work.

Pupils will need materials such as scissors, glue, coloured paper, felt pens, and so on.

Make sure that you have sufficient ICT resources – one computer between four pupils, printer, cameras (still and possibly video) interactive whiteboard and projector.



4. Outcomes

Game on outcomes will depend on how tightly you set the brief. Pupils will either design a new game with reference to existing games or they will use attributes analysis to modify an existing game. Use the autonomy chart above to decide how much choice you can realistically allow your pupils in the types of games that they want to develop. Ideally, pupils will use their skills, knowledge and understanding to produce a new, playable game that has the following elements:

- physical requirements, for example equipment, playing area
- game structure, for example rules, points
- personal requirements, for example the physical or mental attributes of the player.

In addition, pupils will need to demonstrate:

- why they have made or selected particular equipment
- that performance can be improved by practice.

5. Staffing

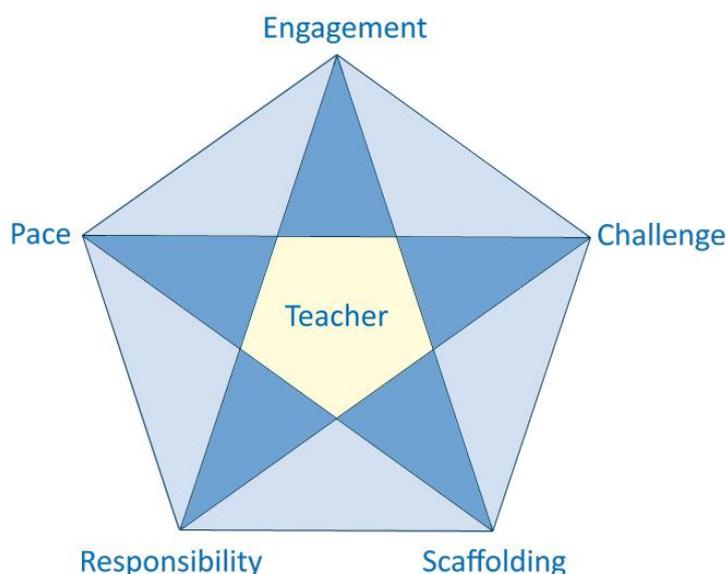
It is essential to have the full support of the leadership team to help raise the status of the project and provide the authority for the planning. You will need to recruit some additional staff to manage the diversity of the learning. You will certainly need Science, Maths and D&T teachers but PE teachers will also be valuable for providing background information and advice.

The key is a team of enthusiastic teachers who are prepared to work on a cross-curricular project. You might want to invite interested parents to help. Involvement of a professional from the STEM or sporting community would also lift the project.

6. Pedagogy

The project requires a different style of teaching from normal lessons. You will assume the role of co-learner and facilitator rather than expert.

The project pentagon shows a number of interrelated factors to be considered when helping pupils to produce successful projects and to move the learning on. Project work is challenging, and the teacher is central to its success.



Project pentagon

A Engagement

A key role of the teacher is to get pupils excited about carrying out their project. This shouldn't be difficult, since pupils are rarely given this opportunity in most schools. You should excite them with both the subject matter and with the plans for group work and presentation.

B Responsibility

The motivation of the pupils depends on your ability to communicate the degree of responsibility expected from them. This depends on the type of pupils you have. At one extreme you could provide a brief and let the group choose, plan, carry out and present their project. Even at the other end of the spectrum, pupils respond well to being trusted with some degree of choice and responsibility.



C Challenge

In Game on pupils set their own targets and level of challenge. This is unlike most other lessons. These challenges need to be negotiated skilfully with the pupils. Pupils can become despondent if they have set themselves impossible tasks. On the other hand, pupils should be given the scope to excel.

D Scaffolding

Decide how much scaffolding to provide in order to keep the project on course. You will certainly need regular plenaries and other discussions to break the learning into reasonably sized pieces. Probing questions should focus pupils' ideas so they think deeply about what they are doing. Each group will need different amounts of support to keep the project moving forward.

E Pace

Over the project day pupils will need thinking time and 'chilling' time. You should still make sure that the project maintains momentum and pace. Do this by agreeing milestones that groups work towards. Give frequent time reminders. If the whole class needs 'lifting' introduce a game or some brain gym.

7. Planning the exposition

The scale of this depends on how many pupils are involved and the ambitions of the STEM team. The profile of the exposition can be increased by moving the display to other places in the school, or further afield to outside the school (for example the local library or community centre). Inviting visitors to watch and give feedback should be motivating for pupils.



Lesson plan

1. Introduce task (5 mins)
2. Activity 1 What makes a great game? (15 mins)
3. Activity 2 Choosing the game (30 mins)
4. Activity 3 The game plan (30 mins)
5. Activity 4 Carrying out the project (120 mins)
6. Activity 5 Assessing the game (45 mins)
7. Activity 6 Talking a good game (30 mins)
8. Activity 7 Well played (25 mins)

Learning skills

- Agree criteria. (C, T)
- Construct an attributes analysis chart. (P, C, I, T)
- Use a chart to plan a project. (P, T)
- Give constructive feedback. (P, C, I, T)
- Evaluate a presentation. (I, C)
- Give a presentation. (C)
- Reflect on learning. (I, C, T)

Learning outcomes

Pupils will be able to:

- Use an understanding of STEM to design a new game.

Resources

- Game on pupil pack: one per group:
 - Game on – cover sheet
 - Activity sheet 1 What makes a great game?
 - Activity sheet 2.1 Choosing the game stimulus
 - Activity sheet 2.2 Choosing the game – attributes analysis
 - Activity sheet 3 The game plan
 - Activity sheet 4 Games cards. Cards to be copied and cut up: one per group.
 - Activity sheet 5 Assessing the game
 - Activity sheet 6 Talking a good game

Equipment and materials

- As requested by pupils. This is likely to include a selection of balls, sticks, straws, sellotape, marker pens, wire, netting, card, paper, poster paper, string, plastic counters, drawing pins.
- Pupil slides of the activities.

Introduce task (5 mins)

Procedure

The precise nature of this summative project will depend on the teacher's judgement. You need to decide how much freedom to allow pupils in terms of the games they choose to design and make. You should also decide how much direction they need to complete the task successfully.

You can provide a range of equipment and materials for pupils to choose from when making their game. If pupils are to be given complete freedom in their designs, a requisition list following their specification of the game design needs to be made. This may need a break of a few days between planning (activities 1–3) and carrying out (activities 4–7).

- a Get pupils to use their learning logs to tell you the story of the topic so far.
- b Discuss which knowledge, skills and understanding from earlier pods may be useful as pupils design a game of their own.

Activity 1 What makes a great game? (15 mins)

Procedure

- a Divide the class into groups of five. In their groups get pupils to think of the essential features of a good game.
- b Get two groups to share their list and come up with seven agreed features of a good game or sport.
- c Take feedback from all the groups to establish a class list of features. Write them on the board for pupils to copy down. The following criteria for the process are included in the Game on cover sheet.

- You must demonstrate that some equipment has been tested or improved.
- You should demonstrate that practice can improve performance in your game.
- You must show that you have responded to feedback in order to improve your game.



d Tell pupils that they will be evaluated according to how well their game meets the criteria.

e Explain that they will also be evaluated on the quality of the presentation of the game. Use the whiteboard to draw up a set of criteria for the presentation. This might include:

- Each member of a team must contribute.
- Presentation was clear.
- The team had prepared well.
- The presentation was interesting.
- The team kept to time.
- The team answered questions well.

Encourage pupils to add criteria that get them to focus on the STEM learning that they have drawn on.

Activity 2 Choosing the game (30 mins)

Procedure

a Give out Activity sheet 2.1 Choosing the game – stimulus or show the pupils the slide of different games. Get pupils to think about the type of game they want to develop. Some important considerations are:

- bat/ball
- number of players
- indoor/outdoor
- goal/hole/net
- target.

b Once pupils have an idea of the game, they use the attributes analysis sheet (Activity sheet 2.2) to put some structure to their design. They can start by using a familiar game and varying the attributes one at a time or they can plan a game from scratch. The sheet serves as a brief for the design of the new game.

Activity 3 The game plan (30 mins)

Procedure

a Get pupils to use Activity sheet 3 The game plan to plan what needs to be done, who is going to do it and when. They will need to allocate tasks in the following areas:

- Research games on the internet.
- Gather evidence to design or select best apparatus.
- Demonstrate that practice can improve performance.
- Design a playing area.
- Write a set of rules.
- Design a scoring system and league systems.

b They should build in checkpoints where they re-group to discuss progress and re-allocate tasks if necessary. There is space on Activity sheet 3 The game plan for feedback during the early stages, and for the key points of final feedback.

Activity 4 Carrying out the project (120 mins)

Procedure

a Check the pupils' ideas for games to make sure that they are realistic and suggest any appropriate modifications.

b Check that the planning charts are realistic and that the division of tasks is appropriate.

c If needed, give out the *Games* cards, which provide advice on how to structure the smaller tasks.

d Distribute the equipment as required and allow pupils to start work.

e Remind groups that they will need to address all the bullet points in the game brief as well as the criteria for the presentation.

f Provide help and advice when needed. Conduct short plenaries to address common problems and highlight good practice.



Activity 5 Assessing the game (45 mins)

Procedure

- a** Tell the pupils that two groups of five will now work together to help improve each other's work.
- b** Group 1 should present to group 2, who will score each criterion out of five and make notes on the game and the presentation. Group 2 then give verbal feedback. The feedback should be based on the brief for the new game and criteria for the presentation. They can use Activity sheet 5 Assessing the game for their feedback notes.
- c** Group 2 then present their game and the roles are reversed.
- d** Each group then makes alterations to its game and presentation based on the feedback from the partner group. Tasks to refine the game and presentation following feedback should be filled in on the planning sheet (Activity sheet 3 The game plan).

Activity 6 Talking a good game (30 mins)

Procedure

- a** Once groups have made their amendments following the first round of feedback, each group makes their final presentation to a different group. Groups use the agreed criteria to evaluate each other's work. They can use fresh copies of Activity sheet 5 Assessing the game.

Activity 7 Well played (25 mins)

Procedure

- a** Reflect on and illustrate pupils' good practice in both the design of a new game and the presentations.
- b** Discuss how versatile each game is and how easily it could be altered for use by participants with different abilities.
- c** Get pupils to reflect on their project work by recording their final thoughts in their learning log.