

Resource Checklist

- 1 per group** Complex Problem Solving Material Plan
- 6 per group** Small bean bags
- 4 per group** Hoops
- 5 per group** Cones
- 3 per group** Skipping Ropes
- 1 per group** PowerPoint

Learning Intentions

We are learning the varied materials required to build a flood wall.
We are learning how complex problems need to be solved during the construction of a flood wall.

Success Criteria

- ✔ I can recognise some of the materials required to build a flood wall.
- ✔ I can understand how these materials are used in the construction of a flood wall.
- ✔ I can understand that scale model versions can be used to help solve problems.
- ✔ I can solve complex problems by calculating risk.
- ✔ I can undertake complex problem solving using trial and error.



Complex Problem Solving Task

AC: Additional Challenge
AS: Additional Support

- Go over the Learning Intentions and Success Criteria.
- Give Grangemouth Flood Protection Scheme Overview.
- Introduce why solving complex problems is an important skill in a project like this using PowerPoint.
- Pupils to be split into teams of 4. Each team is to be given a set of materials at one end of the hall and are seated at the other end of the hall. In between each team and their materials is an obstacle course made up of cones, benches (for balance), mats etc. This can be designed/laid out according to the equipment available and the abilities of the pupils in the class.
- Describe the problem for pupils. A flood wall is to be constructed, but due to the river and housing in the surrounding area the materials required to build the wall cannot be taken to the site by truck and must be delivered via boat. In this activity, the 'boat' is represented by the young people themselves. With a limited capacity per trip, pupils must decide between making multiple trips to transport all materials or taking fewer trips and carrying more materials each time. The more materials they carry the more carefully they must make the journey back; thereby taking more time to make the return journey.
- Use the Material Plan to go through the materials involved and explain what each of them represent in the building of a real flood wall.
- Discuss the specific transportation requirements for each material, e.g., bean bags must be stacked one on top of the other for transport, hoops must be transported with one hoop per limb etc.
- You may need to suggest to pupils that they need to work as a group and invite them to share their suggestions for how they think it would be best to get the materials to site. Make it clear that there is no specific correct answer.
- You may want ask pupils for ways they think they could work out this problem before they start, for example: trial and error using the scale items, deciding in which order they wish to make the trip, placing a team member at the 'loading dock' to help load the items carefully on to the team member making the trip, timing how long it takes to make each journey etc. Ask groups to record their plans on the 'Material Plan' sheet.
- Once pupils are happy with their plan you can begin the 'race'. The winning team is the team that is sitting in a line, one behind the other, with all their transported items.
- Following the 'race' ask groups to evaluate their performance. Is there anything they would change for next time? Provide the opportunity to make changes to race plans before running the 'race' again.
- In the workplace with such complex problems, often we will create a computer programme or a complex spreadsheet to model the potential solutions for these problems. Show examples of this to pupils. These programmes are written by humans but can then be reused to save time.

AS: Pupils will complete the task as a group so pupils can support each other.

AC: Obstacles can be added which the groups must navigate when transporting items back and forth across the hall (e.g. cones that they must go in and out of, benches they must step over or balance on etc.)

Please ensure appropriate safety measures, such as crash mats, are in place.

