## SCIENCE AT O'BRIEN GROUP ARENA

Grades 7, 8 \& 9

## FORCES IN SPORT

## Curling

The key steps to playing curling are:
4. The Delivery - team members sliding the 20 kg granite stone along the ice
5. Sweeping - fast sweeping of the ice in front of the travelling rock to control speed and distance
6. Reaching the 'house' - rocks landing in the target at the end of the ice. The team with rocks closest to the centre of the target win. Opposition's rocks may be hit out by curling rocks at them displacing them out of the target.

Draw a line matching up the action with the force


## FRICTION

Name 3 ways friction plays a part in the sport of curling:
5. $\qquad$
6. $\qquad$
7. $\qquad$


What is a physical reaction to friction?
Try rubbing your hands fast together to feel what happens!

How might this reaction affect the ice when teams are sweeping during a curling game?

Note: Before each curling game, the surface of the ice is lightly sprayed with droplets of water to create a pebbled feel to the ice. You can see the pebbles in the picture below!


## Speed Skating

Science is used all the time in sport helping with anything from calculating speed, to the design of equipment and uniforms. Speed skating is just one of the many sports which customise their uniform to optimize performance.

Take a look at the speed skater below


Explain, in terms of force, how Lycra suits can help skaters travel faster
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$


Compare the three different types of ice skates: Speed, Figure and Hockey. Each has been scientifically designed for the sport they are used in and have different prominent features.

With the requirements of each ice sport in mind, in each of the boxes below write a possible explanation for the particular design and how it might affect the skaters' technique.


Figure Skate


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## Sport Science Experiment

## PART 1

In groups of 2-3 you will be required to investigate the effects of sport equipment and uniform modification in a running race. Each team will assign one designated runner to run three times for a distance of 50 metres. With each run you will be required to make modifications to the uniform of the runner which will either hinder or aid their performance. Your job is to make a prediction on which combination will work best in creating an aerodynamic uniform resulting in the fastest running time, and then prove your hypothesis with scientific evidence.

- Run 1: Run in your school uniform as it is!
- Run 2: Place hole at the bottom of an extra large (un-used) garbage bag big enough for your runner's head. Wear it like a poncho!
- Run 3: Place arm holes in the garbage bag and fasten any excess garbage bag material down creating a tight fit. Aim for a smooth finish at the front. Place a swimming cap or bandanna over the runners head holding any hair down.

Make sure you accurately record the time for each run and give your runner enough time rest between runs!

Aim: $\qquad$
Planning:
what do you predict will happen?
why do you think this wi 71 happen?

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## Method:

List the steps you wi77 follow to conduct your investigation?

What variab7es are you going to imp7ement and study the effect of? Run \#1:

Run \#2:

Run \#3:

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## Equipment:

What materials wil7 you need to complete the experiment?

## Results:

Complete the tab7e below as you conduct your investigation

|  | TIME | ALTERATION | OBSERVATION |
| :--- | :--- | :--- | :--- |
| Example | 26.4 ' | What alterations were <br> made from the initial <br> run | What differences did I notice between this <br> run and the first run? |
| Run \#1 |  |  |  |
| Run \#2 |  |  |  |
| Run \#3 |  |  |  |

Compare your results to another group's
Group members: $\qquad$

|  | Run \#1 | Run \#2 | Run \#3 |
| :---: | :---: | :---: | :---: |
| Time |  |  |  |

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Present your data as a graph as we77 as the other groups obtained data.

How do your results compare to the other groups? why might they be different?

Explain your results using scientific terminology and identifying any forces at work.

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## Evaluation:

What difficulties did you encounter whilst conducting the experiment?

How could they be minimised or made more efficient?

What are some other modifications you could make which might enhance running performance?

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## PART 2 - Run of the Scientists

It's time to put your knowledge to the test!
Your teacher will provide you with some extra equipment are specially designed to hinder your opponent's performance in a variety of ways. You are required to choose one piece of equipment to handicap another team in a class race.

Handicap Options may include:

- Weighted Backpack
- Open Umbrella
- Ankle weights
- Big Shoes
- Hand held weights
- Protective/goalie gear
- Sweater Pants/Tight pencil style skirt
- XL Garbage bag (with head hole but no arm holes)

Once each team has been delegated a handicap - it's time to race! The first team to the finish line, wearing their handicap equipment, wins!

## Results:

which piece of equipment did you assign to another group and why? Explain in scientific terms how this piece of equipment affected the runner using it.

