SCIENCE

ON TRACK

Cubs

WITH

Hot Wheels

PART 1: GET GOING!

What's It About?

The Scout Association has partnered with HOT WHEELS, the COOLEST and most iconic diecast car brand to help Beavers and Cubs explore FUN scientific investigations through STEM learning, (science, technology, engineering and mathematics), using AWESOME, adrenaline-fuelled Hot Wheels cars and track! This activity resource features six tasks which follow a process of inquiry. The steps are:

- **Predict** – using what they already know, what do they think will happen?
- **Test** – set up a way for them to find out if their prediction is correct.
- **Observe** – record what happens in the test.
- **Gather** – gather lots of evidence by observing then test a number of times.
- **Recommend** – use their gathered evidence to make a recommendation.

How Does It Fit / Badges

Beavers –could work towards gaining their Experiment Activity Badge (remember this badge is about doing four experiments; predicting, testing, observing and recommending. They could also work towards gaining their Teamwork Challenge award and My Skills Challenge award (requirement 7).

Cubs - could work towards gaining their Our Skills Challenge award (requirement 5), Scientist Activity Badge (requirement 2) and the Teamwork Challenge Award.

Youth Involvement

We've designed this resource to be at Level 4: Assigned and Informed of the Youth Involvement wall (see Part 3).

Younger Beavers may need to be led through the first few tasks. For example show them how the car goes faster on steeper ramps and then ask them to build a ramp to make the car go faster.

scouts
be prepared . . .

Thinking Tools

We've used a few thinking tools to design this resource. You don't need to know about these to use the resource but if you are curious you can Google:

- **Bloom's Taxonomy** – good for tasks and questioning.
- **De Bono's Thinking Hats** – good for group roles.
- **Tony Ryan's Thinking Keys** – good for quirky, quick tasks based around a theme.

How Do I Do It?

PUSH YOUR LIMITS with Hot Wheels using the resources included! They are designed to help, but you can adapt some cars and questions so that they work for you. Some tests might not work as planned, and your young people might even come up with questions you can't answer – but that is part of the fun! Just GO FOR IT!

What will I need?

- Cars (one per young person is good, one per group is a minimum)
- Straight tracks (and a clamp)
- Stacked books or similar (to create a raised platform)
- A timer or stopwatch (one per group works best)
- Paper, pencil and/or the printable resources to record results (note: most of this can be done through conversation if you prefer!)
- A range of household items to crash into
- Loops and launches
- Tape or string
- Ramps (rulers, metal baking trays work too!)
- Tunnels of some sort

Using This Resource

This resource has three parts:

Part 1: Get Going – this explains the background of the resource and how it links to the Programme.

Part 2: The Ride – this explains the activities and how to do them. These instructions are written ready to be read to your young people.

Part 3: Help Me! – this section includes (optional) printable resources and some technical tips to help you out.

PART 2: THE RIDE

The Hot Wheels Challenge/Tasks

The amazing Hot Wheels World Championships are only a month away and Team Scout is asking for your help. Complete the following six tasks to prepare Team Scout for the ultimate EPIC race! Ready, steady, GO for it!

Your Roles

There will be six awesome roles for different Hot Wheels racers in your team, you will take on a different role for each task. The roles are:

- **Captain** – keep everyone happy, on task and within your time limits. Stay positive!
- **Test Designer** – listen to the group and decide on the test. Be creative!
- **Engineer** – work with the group to build the test. Think about all the options.
- **Tester** – do the test. Be careful and practical!
- **Time Keeper** – time and measure the test, be accurate!
- **Recorder** – take photos, videos, notes and sketches of what happens. Decide what to record!

If your team has less than six people you can choose a team member to have two roles, or ask a leader to play one of the roles.

Leaders: Your Beavers may need some help to play their roles, whilst older Cubs may be able to delegate and rotate roles without adult help.

Warm Up/Cool Down

Leaders: Try these activities to get your teams thinking and bring your colony/pack back together at the end. These activities should be quick, fun and there are no wrong answers!

Novice

The Alphabet Key

Can you think of parts of a Hot Wheels car (or just car related words) for every letter of the alphabet!

The B.A.R Key

Look at your Hot Wheels car – work out how to improve it by making something bigger, adding something and removing something.

Expert

The Forced Relationship Key

Work out how a marshmallow and a matchstick could work together to improve your Hot Wheels car.

The Different Uses Key

How many different uses can you think of for a Hot Wheels car? (e.g ant vehicle, finger exercise machine, massager etc.)

Task 1: Be Faster

Aim: Find out how to make your Hot Wheels car go faster

What to do: Try a number of different tracks with different ramps and curves. Which makes the Hot Wheels car go fastest?

Leaders: What to ask?

- How will/did the cars go fastest/ slowest?
- How can we measure the speed?
- Are there other ways apart from a steep ramp to make the cars go fast?
- What else could we try?
- Can the ramp be too steep?
- What combination works best?

Task 2: Be Informed

Aim: To learn how sports people move quickly

What to do: Watch a series of trials (cycling, auto racing etc) and races online. What do they have in common?

Leaders: What to ask?

- What is the same about them? What is different?
- How can we use what they do to help your cars go fast.

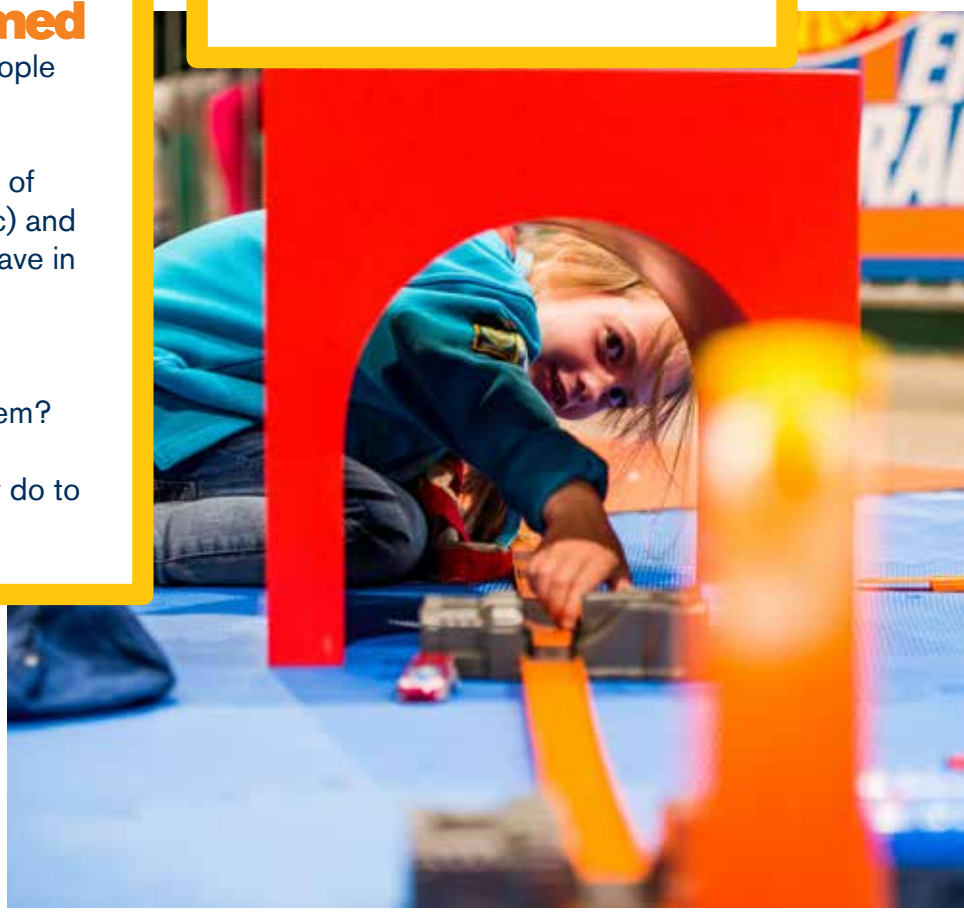
Task 3: Be Safer

Aim: To see how different crashes happen

What to do: Crash the Hot Wheels cars into different sized/ weighted objects? How do the objects react?

Leaders: What to ask? Which objects move the furthest? What do they have in common? Does an object move further when the car is slow or fast? What causes less damage to an object, being hit with a slow car or a fast one?

Older Cubs can extend this by crashing at different speeds and angles. This is a good opportunity to talk about fair testing, and considering the outcome of a test where two things vary (eg. The object and the speed).



Task 4: Be Prepared

Aim: Predict how fast the Hot Wheels car goes on different tracks

What to do: Try a range of different track set ups, long/short, bending/straight and observe the difference in speed of the car.

Leaders: What to ask? When does the Hot Wheels car go fastest? Why do you think this is? Is it safe to go around a corner fast? What might happen if the car goes around a corner too fast? What other tests could we try?

Task 5: Be Original

Aim: Make up your own experiment

What to do: Using the Hot Wheels cars and the process in Part 1, ask your own question and do a test to answer it.

Leaders: What to ask? What do you want to know? Why do you want to know this? When you have an answer/recommendation who will this help? What are you predicting will happen? How could you test this? Is there an easier/more accurate way to test that?

Task 6: Be an Expert

Aim: Share what you now know.

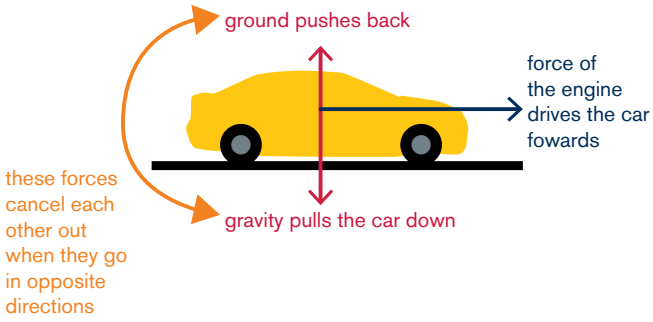
What to do: Share your findings – on the cars and the scientific process, with others. You could visit another group, make a scrapbook, a wall display or a video.

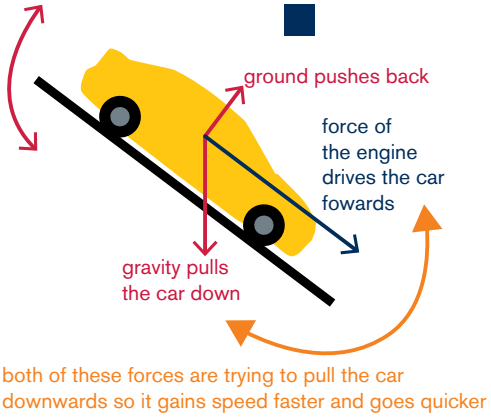
Leaders: What to ask? What are the most important things we learned about the Hot Wheels cars? What are the most important things we learned about testing? How did we learn (test/video/talking/listening/charts)? How can we show this to others?

PART 3: HELP ME!

Task 1: Be Faster

The Hot Wheels cars will go fastest when: **Going down an even slope**: This is because of gravity.





On a slick/smooth surface: This is because there is less friction between the car and a smooth surface than there would be between the car and a rough surface. (think socks vs shoes when running on a wooden floor).

The bigger the drop the faster the car will travel. Watch the Hot Wheels big drop video to see how this happens: **http://www.hotwheels.com/en-gb/videos/connectors-big-drop.html**

Task 2: Be Informed

The Olympic time trials are probably the best example of this as they are short and you can clearly see the team helping each other out. Youtube.com has lots of videos you can look at to see how this happens.

You can talk about:

- The streamline clothes and helmets they are wearing
- Changing leader so that no one gets too tired
- How they work as a team
- How they speed up towards the end

Another option is to look at pit stops in car racing.

You can talk about:

- How everyone has a specific role
- How they have all the equipment ready
- How they communicate with the driver

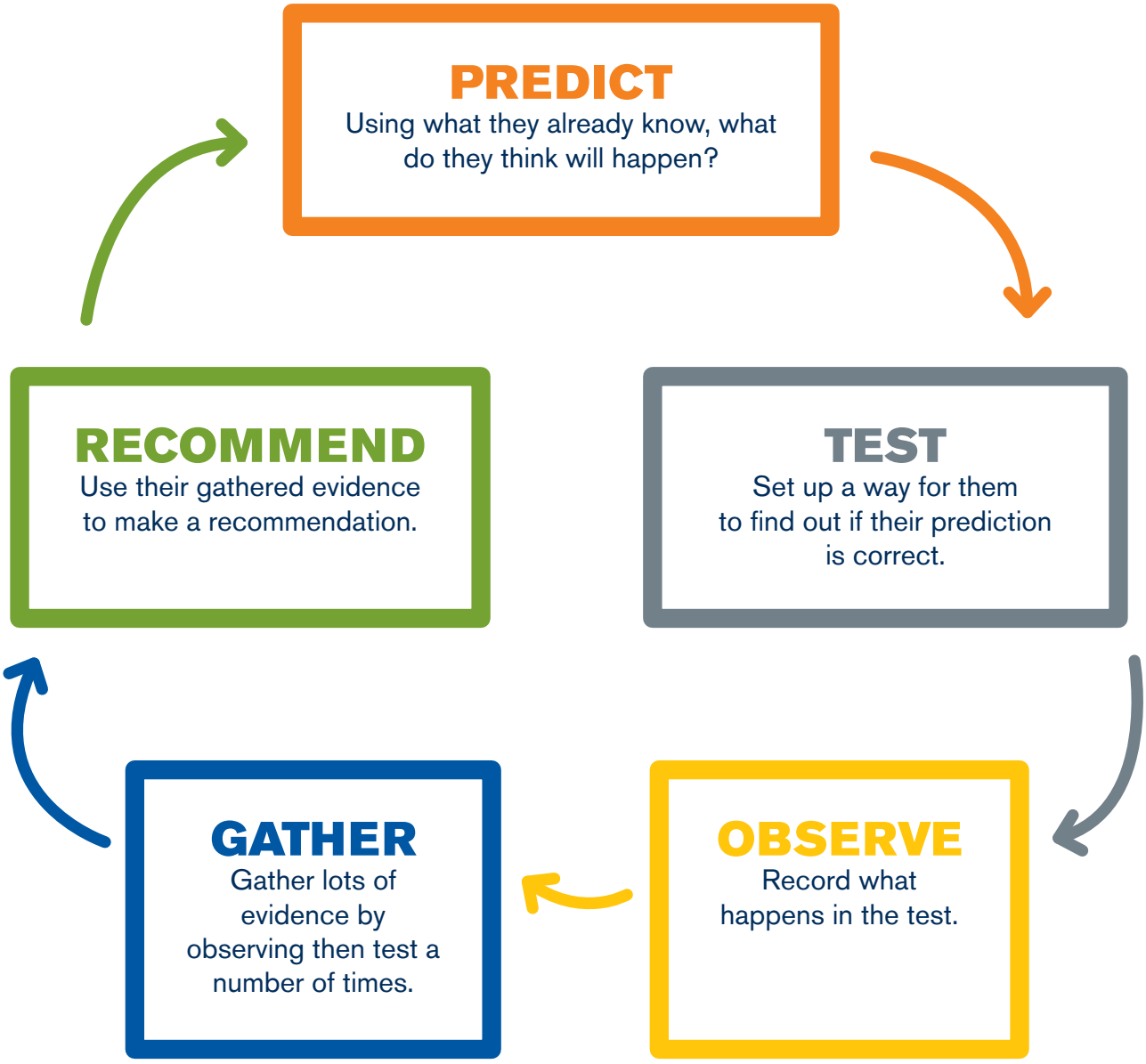
Task 3: Be Safer

The key point here is that the faster the Hot Wheels car goes, and the lighter/smaller the object is it hitting, the further the item will travel.

These tips came from Wikipedia and other online sources, looking things up on the internet is an easy way to answer questions that come up.

PRINTABLE RESOURCES

SET UP
The Process



SET UP
Role badges

CAPTAIN

TEST DESIGNER

TESTER

ENGINEER

TIME KEEPER

RECORDER

WARM UP/COOL DOWN

Novice Tasks

The Alphabet Key

Can you think of parts of the Hot Wheels car (or just car related words) for every letter of the alphabet!

A	**O**
B	**P**
C	**Q**
D	**R**
E	**S**
F	**T**
G	**U**
H	**V**
I	**W**
J	**X**
K	**Y**
L	**Z**
M	**Extra:**
N	

The B.A.R. Key

Look at your Hot Wheels car – work out how to improve it by making something **bigger**, **adding** something and **removing** something.

WARM UP/COOL DOWN

Expert Tasks

The Forced Relationship Key

Work out how a **marshmallow and a matchstick** could work together to improve your car.

The Different Uses Key

How many different uses can you think of for a Hot Wheels car? (e.g ant vehicle, finger exercise machine, massager etc.)

1
2
3
4
5
6
7
8
9
10

RECORD YOUR FINDINGS

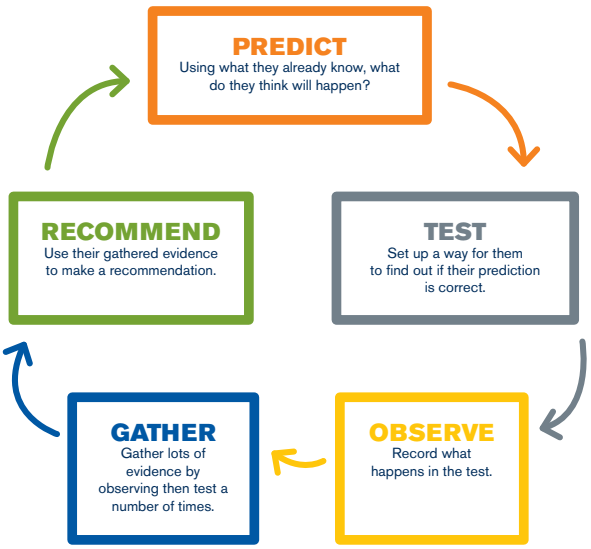
Task 1: Be Faster	Task 2: Be Informed	Task 3: Be Safer
What I saw…	**Who did you research?**	**What I saw…**
What made the car go faster?	**What did you find out?**	**What caused the biggest/smallest crash?**
What made the car go slower?		**Why?**

RECORD YOUR FINDINGS

Task 4: Go Prepared	Task 5: Be Original (see planning sheet)	Task 6: Be an Expert
What I saw…	**What did you find out?**	**How could you share your ideas with oth-ers?**
What made the car go faster?		**What would you tell them?**
What made the car go slower?		

TASK 5 PLANNING SHEET

Make a plan for your own scientific investigation.



What do you want to find out?

Who will this help?

EVALUATION/ RECOMMENDATIONS

I would tell Team Scout...

I would tell people doing these tests to...

Next time I would...