TWENTY FIRST CENTURY science

Assessment for Learning Ideas about Science in OCR GCSE Science A

IaS5 Risk 'How safe is safe?' F tier

Using Key Assessed Tasks

Students work in pairs or individually, then join another pair or student to peer review their work.

The teacher acts as facilitator, intervening as required to support the group in reaching a consensus.

Each task should take no more than an hour to complete.

Acknowledgements

Editors: Jenifer Burden, Peter Campbell and Robin Millar

This resource was developed as part of a project initiated by a group of Twenty First Century Science teachers, meeting first in October 2006 to discuss how Assessment for Learning (AfL) approaches could be applied to the teaching and learning of Ideas about Science. The group was convened by Peter Robinson, SNS consultant for Bury LA, and Jenifer Burden, Co-director for Twenty First Century Science at the University of York Science Education Group. The project has two major outcomes:

- a student-speak version of each IaS (see www.21stcenturyscience.org)
- a series of key tasks, each focusing explicitly on one or two IaS, of which

this is one.

KEY TASK • IAS5 RISK HOW SAFE IS SAFE? F

Learning objective

- We are learning to identify and discuss risk.

Learning outcomes

All of you will be able to give examples of how risks from nuclear power can be reduced.

Most of you will be able to suggest benefits of nuclear power and a parachute jump.

Some of you will be able explain why someone chooses to do a parachute jump by balancing the risks and benefits.

Read and discuss

Tom, Karen and Dave are discussing how we should generate electricity in the UK and the radioactivity levels associated with nuclear power.

Tom says, "I don't like nuclear power, it's dangerous. Look at what happened in Chernobyl, that power station in Ukraine blew up in 1986. We wouldn't want that to happen in Birmingham! And there's always the risk of an accident when transporting nuclear waste. I don't want the UK to invest in a new generation of nuclear power stations; I think that we are better safe than sorry and should stick with coal and wind power."

Dave says, "Nuclear power stations have back-up safety systems to prevent accidents. If something fails, there is a back-up system to limit the danger. If that system also fails there is another back-up system, and so on. So a serious accident is very unlikely. Anyway, the Chernobyl reactor had an unsafe design and that was 20 years ago."

Karen says, "I think that we should build more nuclear power stations, as they will reduce the amount of CO_2 that we release into the atmosphere. This will help the UK meet its climate change targets."

"I think that nuclear power stations are a bad idea", Tom replies. "All ionizing radiation carries a risk to human health. I won't even have an X-ray at my dentist."

"But the risk of having an X-ray is very low. It only adds 1% of the background radiation you receive every year. They make it as low as you can get and still get a good image", said Dave.

"I know statistically, it's actually very safe", said Tom, "but I just think it's too dangerous having it done, I don't know why."

1 What benefit does nuclear power offer to the UK's climate change targets?

2 Who is accepting that in the nuclear industry, *nothing is completely safe*?

3 How is the risk of a serious accident in a Nuclear Power Station reduced?

TURN OVER

The group then go on to discuss Tom's charity parachute jump.

Tom says, "I can't wait until next weekend when I am doing my charity parachute jump."

Dave says, "I can't believe you don't like nuclear power, because you say it's too dangerous, but you'll do a parachute jump!"

Dave asked, "Did you know that each year in the USA about 35 people die while making approximately 2 million parachute jumps? So the chances of an accident are very small, but what about the consequences? I wouldn't risk it if I were you."

Tom replies, "I'm sure it's 100% safe."

Karen says, "The parachute jump can't be completely safe, but Tom will have a back up parachute in case the main parachute fails. Also he'll be jumping "in tandem", attached to an instructor, and he's only doing the one jump, so the risk is really low."

4 Is Tom correct, when he says that the jump is 100% safe? Explain your answer.

5 Why do you think Tom wants to do the parachute jump? Explain in terms of benefit and risk.

KEY TASK • IAS5 RISK HOW SAFE IS SAFE? F

MARKING CRITERIA

Nuclear Power

1 One benefit of nuclear power is that it could reduce the amount of carbon dioxide (CO_2) released into the atmosphere. This would help combat climate change.

2 Tom is stating that nothing is completely safe when he says that there is always a risk of accident when transporting nuclear waste.

3 Risk of accidents is reduced by back up systems. If one system fails, there is another to do the same job.

Parachute Jump

4 Tom is incorrect because nothing is completely safe. Every activity carries a risk.

5 Tom believes there is no risk. He wants to do the jump to raise money and probably for the thrill and enjoyment.

NOW look again at the outcomes for this activity.

Which outcomes have you achieved?

Which outcomes can you improve?