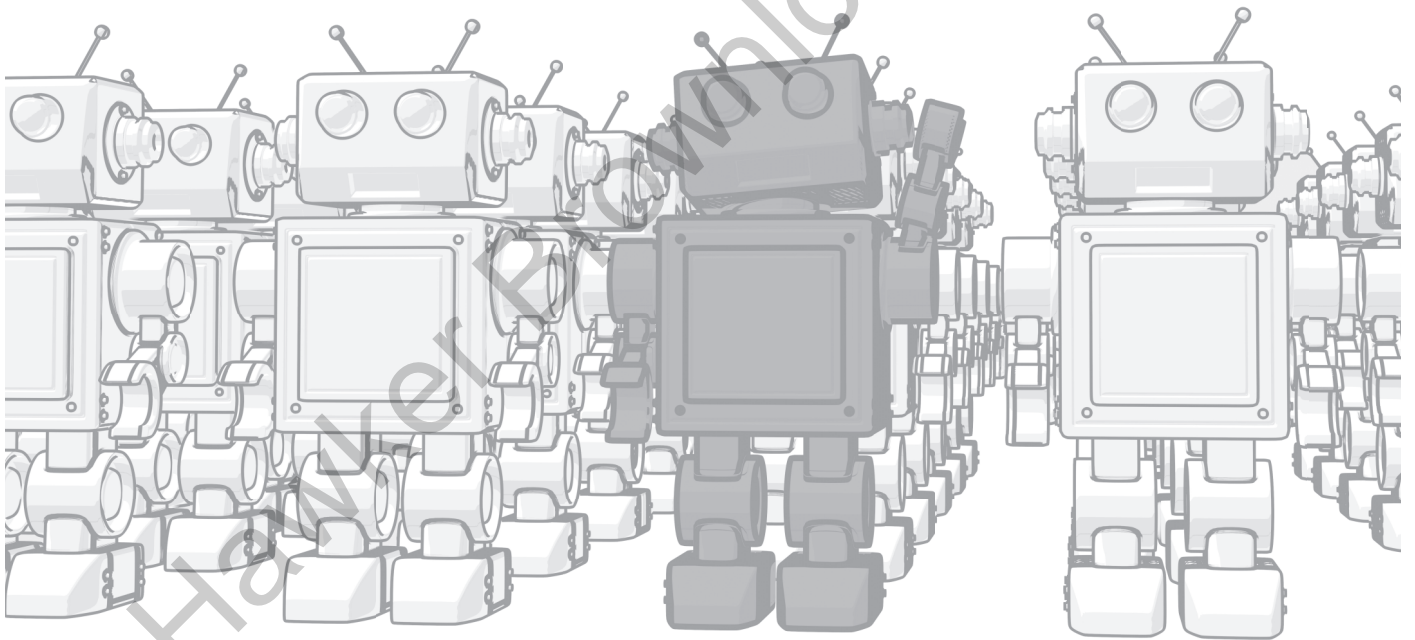


INVENTIONS, ROBOTS, FUTURE



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TO THE TEACHER

The activities in this book have been selected especially for students in Years 4 to 8 and are designed to challenge them and to help them develop and apply higher-level thinking skills. These activities have been grouped by subject matter into the following three sections: Inventions, Robots and Future.

Inventions

Inventions and discoveries change the way people live, and these changes have never been more evident than they are now. More new things have been discovered and invented in the past 150 years than in all of the centuries that went before. It has been said that half of today's products will be obsolete in five years. We dream of better ways to make and do things. Our dreams become inventions of the future, and through our inventing we are able to solve the seemingly insoluble problems we face today. The activities in this section are designed to (1) introduce students to the creative process, which makes discovery and invention possible; (2) highlight a broad range of discoveries and inventions; and (3) encourage innovation, dreaming and inventing.

Robots

We must carefully consider how intelligent machines are going to change our lives. It was once predicted that robotic technology would transform the twenty-first century as much or more than the steam engine transformed the nineteenth century. Will we be able to adjust when machines take over our jobs, when they perform them better than us? How will we spend our increased leisure time? These and other challenging questions that will confront our society during the era of the robot are in this section, which is designed to introduce students to the world of robotics and to stimulate thought about the value of human learning and human endeavour.

Future

Cloning, human hibernation, genetic engineering, technological and social innovations, cultural and value changes – is our society capable of making the moral and ethical decisions that these issues might require? Futurists respond with an enthusiastic yes, if educators effectively teach to the future.

By becoming aware of what the future may hold, students gain confidence in their abilities to anticipate and adapt to it. This section challenges students to speculate creatively about future changes, to consider many alternatives and to imagine the “unimaginable”.

Within each of these three sections are noticeboard and learning centre ideas, a pretest and a post-test, as many as 29 activity pages, detailed instructions for more than 50 activities, suggestions for further activities, an answer key and an award to be given to students who satisfactorily complete the unit of study. These materials may be used with your entire class, for small-group instruction or by individuals working independently at their desks or at learning centres. Although you may want to elaborate on the information presented, each activity has been described so that students can do it without additional instruction.

TO THE TEACHER (CONTINUED)

All of the activities in this book are designed to provide experiences and instruction that are qualitatively different and to promote development and use of higher-level thinking skills. For your convenience, these activities have been coded according to the Bloom's revised taxonomy. The symbols used in this coding process are as follows:

- RE** Remembering: recall of specific bits of information; the student absorbs, remembers, recognises and responds.
- UN** Understanding: comprehension of communicated material without relating it to other material; the student explains, translates, demonstrates and interprets.
- AP** Applying: using methods, concepts, principles and theories in new situations; the student solves novel problems, demonstrates use of knowledge and constructs.
- AN** Analysing: breaking down a communication into its constituent elements; the student discusses, uncovers, lists and dissects.
- CR** Creating: putting together constituent elements or parts to form a whole; the student discusses, generalises, relates, compares, contrasts and abstracts.
- EV** Evaluating: judging the value of materials and methods given purposes; applying standards and criteria, the student judges and disputes.

These symbols have been placed in the left-hand margin beside the corresponding activity description. Usually, you will find only one symbol however, some activities involve more than one level of thinking or consist of several parts, each involving a different level. In these instances, several symbols have been used.

Although Inventions, Robots and Future can be presented as separate topics, if you present them as parts of an integrated unit, your students will gain a more accurate picture of the spirit of discovery, a deeper appreciation of past achievements, a greater awareness of present challenges and a broader understanding of how they can create a better world for themselves and for society in the future.

INVENTIONS, ROBOTS, FUTURE AND THE AUSTRALIAN CURRICULUM

In recent years, the Australian Federal Government has been working closely with state and territory educational offices in an effort to implement a national curriculum for all Australian schools. This Australian Curriculum sets consistent national standards for education in an effort to improve learning outcomes for all students, as well as laying the foundations for future learning, growth and active participation in the community.

Inventions, Robots, Future asks students to think creatively about the future, and the amazing inventions, events and endeavours that could become a reality. By completing the various activities in *Inventions, Robots, Future*, including writing about, designing and drawing their vision of the future, students will support their learning in other Australian Curriculum subject areas, including The Arts, English, History, Geography, and Science.

By using *Inventions, Robots, Future*, teachers will build on two of the Australian Curriculum's general capabilities, Literacy and Critical and creative thinking, which both work to encourage inquisitiveness, open- and fair-mindedness, persistence, self-sufficiency and teamwork in students, not only in schoolwork, but also in life.

The general capabilities “encompass the knowledge, skills, behaviours and dispositions that, together with curriculum content in each learning area and the cross-curriculum priorities, will assist students to live and work successfully in the twenty-first century” (ACARA 2014). Ultimately, the capabilities aim to ensure “all young Australians become successful learners, confident and creative individuals, and active and informed citizens” (MCEETYA 2008). As stated in the Melbourne Declaration on Educational Goals for Young Australians (2008):

Successful learners...	
<ul style="list-style-type: none"> develop their capacity to learn and play an active role in their own learning 	<ul style="list-style-type: none"> are able to plan activities independently, collaborate, work in teams and communicate ideas
<ul style="list-style-type: none"> have the essential skills in literacy and numeracy and are creative and productive users of technology, especially ICT, as a foundation for success in all learning areas 	<ul style="list-style-type: none"> are able to make sense of their world and think about how things have become the way they are
<ul style="list-style-type: none"> are able to think deeply and logically, and obtain and evaluate evidence in a disciplined way as the result of studying fundamental disciplines 	<ul style="list-style-type: none"> are on a pathway towards continued success in further education, training or employment, and acquire the skills to make informed learning and employment decisions throughout their lives
<ul style="list-style-type: none"> are creative, innovative and resourceful, and are able to solve problems in ways that draw upon a range of learning areas and disciplines 	<ul style="list-style-type: none"> are motivated to reach their full potential.

Confident and creative individuals...	
<ul style="list-style-type: none"> have a sense of self-worth, self-awareness and personal identity that enables them to manage their emotional, mental, spiritual and physical wellbeing. 	<ul style="list-style-type: none"> have the confidence and capability to pursue university or post-secondary vocational qualifications leading to rewarding and productive employment
<ul style="list-style-type: none"> have a sense of optimism about their lives and the future. 	<ul style="list-style-type: none"> relate well to others and form and maintain healthy relationships
<ul style="list-style-type: none"> are enterprising, show initiative and use their creative abilities. 	<ul style="list-style-type: none"> are well prepared for their potential life roles as family, community and workforce members
<ul style="list-style-type: none"> develop personal values and attributes such as honesty, resilience, empathy and respect for others. 	<ul style="list-style-type: none"> are motivated to reach their full potential.
<ul style="list-style-type: none"> have the knowledge, skills, understanding and values to establish and maintain healthy, satisfying lives. 	<ul style="list-style-type: none"> embrace opportunities, make rational and informed decisions about their own lives and accept responsibility for their own actions.

INVENTIONS, ROBOTS, FUTURE AND THE AUSTRALIAN CURRICULUM (CONTINUED)

Active and informed citizens...	
<ul style="list-style-type: none"> act with moral and ethical integrity 	<ul style="list-style-type: none"> are able to relate to and communicate across cultures, especially the cultures and countries of Asia
<ul style="list-style-type: none"> appreciate Australia's social, cultural, linguistic and religious diversity, and have an understanding of Australia's system of government, history and culture 	<ul style="list-style-type: none"> work for the common good, in particular sustaining and improving natural and social environments
<ul style="list-style-type: none"> understand and acknowledge the value of Indigenous cultures and possess the knowledge, skills and understanding to contribute to, and benefit from, reconciliation between Indigenous and non-Indigenous Australians 	<ul style="list-style-type: none"> are responsible global and local citizens.
<ul style="list-style-type: none"> are committed to national values of democracy, equity and justice, and participate in Australia's civic life 	

While it is recommended that teachers use the content in this book with their Australian Curriculum-aligned lessons, the activities featured in *Inventions, Robots, Future* can just as easily be used with other educational frameworks at the state or institutional level. For a full overview of the Australian Curriculum please visit <http://www.australiancurriculum.edu.au/>.

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