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INTRODUCTION

For 35 years Phantasialand has been providing top-quality entertainment for visitors of all ages.

Many unique projects have come to fruition during this time, all offering a lot more than thrills and excitement. All the buildings in Old Berlin, Heino’s coffee house, the restaurant and the waffle bakery are presented in authentic style, a nostalgic historicist boulevard bringing the Berlin of around 1900 vividly back to life.

Old Berlin is just one example of Phantasialand’s many theme areas. Each has its own individual character but they all have one thing in common: the potential for learning through experience. Phantasialand offers many opportunities for education away from the classroom - there’s a highlight for every subject and every year group. The excitement of the school trip stays in pupils’ memories, as does the history they explored here and the mysteries of the 3D cinema.

We believe that everyone who can should contribute to the education of young people. This work book is our contribution. Phantasialand has drawn on its wealth of resources to develop this aid for teachers planning an educational visit to the park. The emphasis is very much on learning in action. The book was written by teachers who specialise in each particular area and was designed around the topics covered by the school curriculum in North Rhine-Westphalia.

We wish all teachers and pupils lots of fun and happy learning.

Your Phantasialand team.

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Picture credits:
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AKG Berlin
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Designed and produced by:
Phantasialand Schmidt–Löffelhardt GmbH & Co. KG, Brühl
The Brandenburg Gate at Phantasialand

Berlin’s most famous monument, the Brandenburg Gate, makes a grand statement at the entrance to Old Berlin at Phantasialand. It is a 1:2 scale replica of the real Brandenburg Gate.

The original Brandenburg Gate was built by Carl Gotthart Langhans at the end of the 18th century (completed in 1791). It was once one of eight city gates in Berlin and also a customs point. In those days, everyone entering the city had to pass through one of the gates, and people transporting goods had to pay a toll as well. If you look closely at the gate, you’ll see that a much simpler design would have been perfectly acceptable as an entry and exit point for the city. But Langhans wanted to do more than build something practical. So he based his design on a particular ideal – how he did this, you’ll soon discover.

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Now compare the two again. Focus this time on the overall impression created "...

Task 2

Why do you think an architect would take his inspiration for a city gate from the design of a temple?

When you compare the two pictures closely, you can see how architects like Carl Gotthard Langhans based their designs on the architectural ideal of ancient classical times. This style of architecture is called classicism.

Classicism originated at the end of the 18th century as a reaction against baroque and rococo style (see section 2). Classicism, which is characterised by strict geometrical structures, replaced the ornate, richly decorated forms of the late baroque era with a more formal, classical style. But classicism was about more than a revival of classical antiquity. It also had an ideological function and was closely linked with events taking place in France at the time (the French Revolution). Classicism expressed the democratic ideal of Greek antiquity; people saw a reflection of that ideal in art.

When we talk about the architecture of Greek antiquity, we normally mean Greek temples. The development of Greek temple architecture in the 5th century BC is a highpoint in the history of architecture. The classical architecture of the Brandenburg Gate raises it above being a mere city gate. Instead it is an architectural monument whose designer went back to the classical Greek ideal because he wanted to create the impression of the sublime and the everlasting.

What is a temple? It’s a building for a god or gods. A sacred building. In architecture there’s a distinction between sacred (religious) and secular (non-religious) buildings.

Task 3

What effect is created by the design of the gate?

Task 4

The Brandenburg Gate at Phantasialand.

The Acropolis
Buildings in Old Berlin

We’re in Germany in the 2nd half of the 19th century. The idea of progress is setting the tone in all areas of daily life. Real innovations in science and technology are leading to radical changes in society. Membership of a guild is no longer compulsory, customs points are disappearing, modern transport and communications are being developed, consumer goods produced in factories are making many things available to large sections of society for the first time - the rise of the bourgeoisie is complete. But “progress and trust in a better future” was only one side of the coin for the newly established middle classes; the other was “a return to old values”. People increasingly felt a need to emulate the lifestyle of the nobility in centuries gone by. This also expressed itself in a new style of architecture.

Can you imagine what style of architecture would best express the aspirations of the bourgeoisie? Take a look at the streets of Old Berlin at Phantasialand. The buildings here are exact copies - right down to the last detail - of real Berlin buildings and streets dating from the second half of the 19th century. What do you notice when you compare them to today’s style of architecture?

Historicism

The architectural style which fulfilled the needs of the bourgeoisie in the second half of the 19th century - by allowing them to replicate the splendour of past eras in their homes - is known as historicism (from the Latin: historia). At this time architects attempted to revive historical styles. Classical elements (see section 1) were retained, but architects also incorporated stylistic elements from the Romanesque, the Gothic, the Renaissance and the baroque periods. Egyptian and oriental forms were also popular. The heyday of historicism was in the 19th century.

No movement without a counter-movement - art nouveau

“So many styles are leading to a loss of style.” Towards the end of the 19th century, the critics of historicism became more and more vocal. Young people throughout Europe called for art to assert itself against the mixture of styles by using forms and lines taken from nature instead. The new art was not confined to the stylisation of nature (rippling water, leaf and flower forms etc.); all spheres of life were to become fused with art once more.

Renaissance

The word Renaissance means rebirth. It reflects a concern with the forms of antiquity. Renaissance-style architecture saw a return to the architectural elements and decorative forms used in ancient times (see also section 1). The hallmarks of Renaissance/classical architecture are rigour of construction and clarity of overall impression.

Arts and crafts

In the streets of Old Berlin you can see exactly what the mixture of styles would have looked like in the 19th century.

Look through these illustrations of stylistic details, then look at the photographs of the buildings and try to identify the different eras. (Only the four main styles are included: classicism, Renaissance, baroque and art nouveau.)

Historicism

Triangular pediment

Segmental pediment

Early baroque pediment

Arabesque: a decoration using leaves and tendrils, usually in a symmetrical, naturalistic arrangement. Heads and figures are sometimes included.

Balustrade: a railing system with balusters. A baluster is a short, bulbous column or curved support post. Most often used as banisters.

Rocaille style
The term baroque (17th century) is derived from the Portuguese word barucco, which is a pearl that is not round but of unpredictable and elaborate shape. The baroque did not invent new forms. It continued the art forms of the Renaissance, adapted them and made them more striking and dynamic. Flat façades were replaced by relief decoration of a concave (inwards) or a convex (outwards) nature. Unlike classicism or the Renaissance, the baroque style made liberal use of ornamentation. The baroque style is high-flown, dramatic and dynamic.

Decorative elements

Auricular style
Cartouche: shield-shaped ornament with foliage decoration
Console
Volute: spiral scrolling ornament on a console
Rocaille: ornament with dainty, elegant shell forms

Art nouveau

Gütersloh/Westphalia, town house dating from 1902: art nouveau elements on the corner windows, the door and the balcony and the floral ornamentation are combined with historical regional styles (Weser Renaissance, baroque).
Summary:
Historicism made use of historical stylistic elements without any recognisable system. Whenever a new building was planned, architects had the full repertoire of historical styles at their disposal from which to select the elements that best matched their requirements and those of their client. The extent to which a historical style was taken up in the new design was at the discretion of the architect – from incorporating a single architectural principle to outright imitation. Architects often went even further and began to use styles from several historical eras on a single building. This led to an extreme mixture of styles known as eclecticism (from the Greek: selecting, picking out).
For years 9 –11/Brandenburg Gate

History

Quadriga returns to Berlin in triumph

Berlin, 10 June 1814. The journey took her two months, she travelled in six carriages pulled by 32 horses and at the end it was like a triumphal procession. Yesterday the quadriga from the top of the Brandenburg Gate arrived at Grunewald hunting lodge unscathed. King Friedrich Wilhelm IV of Prussia ordered her return to Berlin as soon as he marched into Paris and has already arranged for her to be restored. In future, the king expressly wishes goddess Eirene to hold the Iron Cross in a crown of oak leaves surmounted by the Prussian eagle, as a symbol of the Prussian victory. “The city gate will become a triumphal arch”, said the delighted architect Friedrich Schinkel. (No. 1)

Eirene, goddess of peace, carried off to Paris

... wasn’t it bad enough that she’d had to look on as unkempt French soldiers - wearing no wigs and smoking tobacco - marched through the gate beneath her and occupied Berlin? And that, on 27 October 1806, Napoleon had ridden in triumphal procession into Berlin and had set up quarters in the royal palace? No, there was worse to come: at the beginning of December, Napoleon ordered Eirene and the full quadriga to be removed from the Brandenburg Gate and taken as a victory trophy to Paris. It took seven days for the enormously heavy figures to be lifted down from the gate and packed into thirteen crates. All that remained on top of the gate was the bare fixing post, visible from afar as a daily reminder to Berliners of their humiliation - their defeat at the Battle of Jena and Auerstädt in 1806 and the occupation of Prussia by Napoleon's troops. (No. 2)

2 May 1945

Berlin, 3 May 1945 - eyewitness report. “The Führer is dead - Berlin has capitulated, the Russians are moving in”. When we hear this news in the air-raid shelter, we can hardly believe it. Eventually we brave the daylight and look around. The street is strewn with debris, roof tiles and torn-off branches. Whole uprooted trees lie here and there. Unter den Linden, the Brandenburg Gate. Black smoke rises in the distance. The quadriga and parts of the gate have been destroy-
ed. The red flag is already fluttering above the gate... (No. 3)

The fall of the Wall

Berlin, 9 November 1989: people from East and West Germany embrace in floods of tears. After 28 years, the Brandenburg Gate is open once again. The Wall comes down ... from now on, the Brandenburg Gate becomes the symbol of German reunification. (No. 4)

How do you think the Brandenburg Gate came to symbolise what it did at each stage in its history?

Discuss!

A symbol of German reunification, a symbol of ... At each of the moments in history described in the cuttings, the Brandenburg Gate acquired a certain symbolic status. Try to work out what it symbolised on each occasion and write your thoughts beneath the text.

King stayed away from opening

Berlin, 7 August 1971. Police and customs patrols have already taken up positions to the left and right of the elegant columns, and the first carriages, riders and pedestrians have already passed through. Yesterday saw the opening of the Brandenburg Gate, the eighth of Berlin's city gates. This new entrance to the city is 62 metres wide, 11 metres deep and 20 metres tall. It stands at the end of the beautiful avenue Unter den Linden. Six pairs of Greek columns thrust proudly towards the blue sky. The wide central passage may only be used by the king's carriages. The gate's crowning glory, a Roman chariot pul-
led by four horses (quadriga) and steered by Eirene, the goddess of peace, is planned but was not able to be completed in time ... (No. 5)

Focal point for Nazi show of force

30 January 1933 – the day the Nazis seized power. The fascists, car-
yring torches, march through the Brandenburg Gate and along Unter den Linden to mark the event of Hitler taking over the government. Throughout the night of 30/31 January, the gate is the focus of the Nazi celebrations. And so it continued: for years to come, the ave-

On the sidelines

Berlin, 14 August 1961. Workers' combat units and National People's Army soldiers block off the Brandenburg Gate with tanks. The building of the Berlin Wall has begun. For the next 28 years, the Brandenburg Gate - graced by the quadriga once more but without the Prussian symbols of victory, the Iron Cross, the crown of oak leaves and the eagle - will stand in the no-man's-land behind the Wall. A sad reminder, robbed of its function as a gate, with nobody passing through. (No. 7)

Look closely at the Phantasialand replica of the Brandenburg Gate. When in history did the real gate look the same as this?
What makes a typical western town?

These two pages show photos of the western town at Phantasialand. What buildings do you find in a western town? A saloon, of course, but what else?

Can you think of any other buildings?

Below is a passage about what things were like when the first settlers went west, built their homes and set up the first towns. But watch out. Some things aren’t quite right. Read through the passage and underline anything that strikes you as odd. There are some alternative suggestions in the table after the text. Every time you come across a mistake, write it down in the table. The pictures are there to help too.

The long trail

The long trail west

Boiling hot in the summer, ice cold in the winter, spring and autumn often see hurricanes raging across the flat landscape: it’s no wonder most of the pioneers of the Wild West, the great plains stretching out between the Missouri, the Mississippi and the Rocky Mountains, wanted to pass through as fast as possible.

It took the caravans five to six months to reach the mild and fertile valleys of Oregon and California. The journey was also very dangerous: crossing the craggy Alps, the violent wind storms and attacks by the American Indians meant many never reached their destination. Despite the dangers, more than 750,000 people embarked on the long trail west between 1836 and 1890.

The Indians were friendly towards the first of the white people, such as traders (e.g. of TVs). Later they felt threatened by the large numbers of settlers. The white people hunted bison with automatic pistols and took away the Indians’ livelihood. The people who did survive the dangerous journey got busy with house building straightaway. In the north-west, it was especially urgent because of the harsh winters and people helped each other out. The forests supplied enough wood to build log cabins. The individual tree trunks were heaved up on cranes; the roofs were covered with wooden shingles collected by the settlers on their way west.

The first towns developed when craftsmen and traders settled in a particular place to offer their services along the trail. Other towns grew up where precious ores, gold and silver were found. The western town at Phantasialand is called Cow City.

Western towns everywhere were very similar in appearance. The main street ran parallel with the railroad and was lined by the hotel, the saloon, the cinema, the sheriff’s office, the bank, a store, the theatre and the homes of merchants who had made it good. In the adjoining streets were the post office with telephone booths, the church, the school, the mill and the photographer’s studio.

Imagine you’re a cowboy or cowgirl. You’ve just driven your cattle across the plains. You’ve been riding for four months now and you’ve travelled 2,000 kilometres. Finally you’ve made it to Cow City and your cattle are being loaded onto the railroad. It’s a tough life: day after day you’ve spent 14 hours in the saddle, you’ve been sleeping rough and you’ve grilled your meat over a campfire.

You hardly remember what a bathtub looks like, and it’s impossible to tell what colour your clothes were when you started out. You’ve only had your horse for conversation, you haven’t heard from your family for ages and your hair’s dangling in your eyes.

You’ve got some catching up to do. So what will you do now? Which buildings are you going to visit?
Estimating and calculating velocity

Your hair’s flying everywhere, the wind’s whistling in your ears and you’re being pressed back into your seat – you’re riding the Colorado Adventure and you’re racing round the bends at a terrific speed. At a terrific speed? How fast is the Colorado Adventure? Is it possible to work it out without looking at a speedometer?

You’re about to cross the road. Two cars go by really fast. That was more than 50 km/h, wasn’t it? Is it there a way of knowing how fast a car is going without being in it yourself?

Calculating velocity

Definition: the motion of a vehicle, a pedestrian or an animal can be described in terms of its velocity. To calculate this velocity, you need to know the distance covered and the time taken. You can then work out an average velocity. To calculate an average velocity, use the formula

\[
\text{Average velocity} = \frac{\text{distance}}{\text{time}}
\]

The velocity is given in metres per second (m/s).

Calculate the average velocity of the Colorado Adventure in metres per second (m/s). The Colorado Adventure is 1,280 metres long and each ride lasts 3 minutes and 3 seconds.

Task 1

The velocity of the Colorado Adventure is calculated in m/s, as in the definition. But speed limit signs and car and bike speedometers show speeds in kilometres per hour (km/h). What’s the difference?

When you’re riding your bike and your speedo shows 18 km/h, you’re not going 18 metres every second, you’re doing much less. To convert km/h to m/s, you’ll need to know that there are 1,000 metres in 1 km and 3,600 seconds in one hour (1 hour = 60 x 60 seconds = 3,600 seconds). In the calculation you convert the units of measurement and reduce to the lowest term:

\[
\begin{align*}
18 \text{ km} & \quad 1,000 \text{ m} \\
& \quad 3,600 \text{ s} \\
& \quad 180 \text{ m} \\
& \quad 36 \text{ s} \\
& \quad 5 \text{ m} \\
& \quad 6 \text{ s}
\end{align*}
\]

This calculation can be generalised. To convert km/h to m/s, divide the velocity in km/h by 3.6 (18 ÷ 3.6 = 5) and replace the units. To convert m/s to km/h using the Colorado Adventure as an example, the velocity in m/s has to be multiplied by 3.6 instead:

\[
\begin{align*}
7 \text{ m/s} & \quad 7 \times 3.6 \\
& \quad 25.2 \text{ km/h}
\end{align*}
\]

When you’re talking about velocity, you should always try to use suitable units of measurement. The shifting sands dunes of the Sahara desert can drift up to 30 metres per year. That’s so slow that you wouldn’t express the velocity in m/s or km/h. Can you think of other instances where you wouldn’t express velocity in m/s or km/h?

Task 2

When you’re a pedestrian, it’s just as easy to estimate how fast a car is going. All you have to do is measure a section of the pavement, e.g. the space between two lamp posts. Make sure you have a clear view. If you have a stopwatch, you’ll be able to estimate the speed of a car really accurately.

A car in a 30 km/h zone takes approx. 4 seconds to go 40 metres. Calculate its average velocity. Was it sticking to the speed limit?

You can try the same thing to work out the speed of cars outside your school. Create a table for your chosen section of road. Note down how long each car takes to travel that distance, then fill in their estimated velocity.
Mystery Castle – acceleration

The Mystery Castle shoots you 65 metres high in a flash, then sends you back to earth faster than in freefall. It gives you an idea – on a reduced scale, naturally – of how it feels to be catapulted into space. The speeds involved are less than those of a car travelling on a country road, but riding the Mystery Castle is almost as breathtaking as a trip in the Space Shuttle.

Acceleration is a key concept in physics. Average acceleration within a given time is calculated using this formula:

\[
\text{Average acceleration} = \frac{\text{change in velocity}}{\text{time}}
\]

Acceleration is calculated in metres per second\(^2\) (m/s\(^2\)) because the unit of velocity (m/s) is divided by the unit of time.

You might have heard phrases like “The racing driver experiences 2 g on the bend” or “When the rocket lifts off, the astronauts are having to withstand 5 g”. Acceleration is often expressed as a multiple of acceleration due to gravity, or “g”. Acceleration due to gravity is approx. 9.81 m/s\(^2\); the velocity of an object in free fall increases by 9.81 m/s every second (equating to more than 35 km/h). The Mystery Castle exposes you to substantial forces of acceleration, both in the ascent and in the descent: coming down you hit a maximum velocity of 21 m/s, two seconds later you’re going up again at 17 m/s. Within this time, your velocity changes by 38 m/s, which equates to an average acceleration of 19 m/s\(^2\), or approx. 2 g. The maximum acceleration of the Mystery Castle is between 3 g and 4 g. When the Space Shuttle lifts off, the astronauts are exposed to 5 g acceleration for several minutes. Military aircraft ejection seats can briefly reach 15 g.

When a lift accelerates or brakes, it subjects you to a force, as you can see from the scales. In Sir Isaac Newton’s day there were no lifts of course, but similar observations led him to formulate his first law of motion (the law of inertia) in 1687:

An object at rest or in uniform motion in a straight line will remain at rest or in the same uniform motion unless acted upon by an external and unbalanced force.

You can try some simple experiments yourself to investigate the inertia of objects.

Task 1
Experiments:
I) Place a paper cup on a sheet of paper. Pull the paper away very quickly. Then fill the cup with sand or water and do the experiment again. Do this somewhere where it won’t matter if things spill. How do you explain the different outcomes?
II) Place five identical coins in a pile. Flick another coin gently against the bottom coin. Is there any difference if you have just two coins in the pile?

These experiments allow you to observe the inertia of objects from an external point of view. But when you’re exposed to acceleration yourself, you can actually feel it. The Mystery Castle is a brilliant way to experience acceleration.

Who knows, one day you might train as an astronaut - after the Mystery Castle, you’ll know what to expect.

Task 2
Experiments:
I) Place a paper cup on a sheet of paper. Pull the paper away very quickly. Then fill the cup with sand or water and do the experiment again. Do this somewhere where it won’t matter if things spill. How do you explain the different outcomes?
II) Place five identical coins in a pile. Flick another coin gently against the bottom coin. Is there any difference if you have just two coins in the pile?

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Tasks:
I) Describe what happens to the blood in a pilot’s body when he accelerates into and then suddenly abandons a dive.
II) Name some situations in which you are aware of your body’s inertia.
Observation task for the visit to the 3D cinema:
Take your glasses off for a moment during the first few scenes of the film. What’s the difference compared with a normal cinema?

Bats flying right in front of your eyes, a saber missing you by a whisker, crabs threatening to pinch your nose. In a 3D cinema you’re more than just a spectator – you’re right at the heart of the action. How come? An essential requirement for this 3D effect is spatial vision. This simple experiment will demonstrate that your two eyes are sending different messages to your brain.

Hold a small object (e.g. an eraser) approx. 10 centimetres from your eyes. Now open one eye at a time and notice the difference in what you see.

The observation you’ve just made is really important for understanding how a 3D cinema works. The greater the difference between what you see with each eye, the clearer the three-dimensional effect. For a 3D cinema, films have to be filmed from two different perspectives: once for the left eye, once for the right eye. At the film screening, the film “for the other eye” has to be blocked. Here’s where the 3D glasses come in – they act as a polarising filter.

Definition of polarisation:
Light travels in waves, just like radio waves and microwaves. Normally a light wave vibrates vertically in all directions as it travels. This is unpolarised light (Fig. 1). When light vibrates in a single direction, we say it is polarised. We cannot see whether light is polarised or unpolarised, but we can produce polarised light from unpolarised light using a polarising filter.

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The best way to understand how a polarising filter works is to try using one. You can do this in the following simple experiment.

Observation: the reflection of the light from the lamp disappears when you hold the filter in two specific positions, between which is an angle of 180°. In the experiment described above, you observed how you could – or could not – see the reflected light, depending on how you turned the polarising filter. To understand how the reflected light disappeared, you need to know how a polarising filter works. You can simulate this with a simple mechanical experiment.

Do this experiment with a partner. Stand with one person on either side of a railing and feed a rope through the bars. One person moves the rope evenly up and down, first parallel with the bars, then horizontally right and left, to create waves (Fig. 2). This is simulating a polarised light wave. Notice whether the wave reaches the other side of the bars or not.

Just as in the experiment with the rope, light can be polarised through a filter. The filter allows light vibrating in one direction to pass through, but it absorbs the light that is vibrating at a 90° angle (Fig. 3). In experiment 2, the reflected light that disappeared when you turned the filter must have been polarised light. As a general rule: unpolarised light that is reflected on a water surfaces becomes polarised. Only the part of the light that is vibrating in parallel with the reflecting surface is reflected.

Polarising filters are a natural phenomenon. They weren’t invented by humans; they occur in nature. Grey herons, for example, have polarising filters in their eyes. So what’s the connection between polarising filters and the 3D cinema at Phantasialand? The film was recorded and screened vertically polarised for the left eye and horizontally polarised for the right eye. Because the polarised lenses in Phantasialand’s 3D glasses are also polarised differently – the left vertically, the right horizontally – each of your eyes only sees the part of the film that was shot using that perspective. Inside your brain the two different images seen by your eyes fit together as one complete and very impressive three-dimensional picture.

The observation you’ve just made is really important for understanding how a 3D cinema works. The greater the difference between what you see with each eye, the clearer the three-dimensional effect. For a 3D cinema, films have to be filmed from two different perspectives: once for the left eye, once for the right eye. At the film screening, the film “for the other eye” has to be blocked. Here’s where the 3D glasses come in – they act as a polarising filter. So, what is polarisation?
SOLUTIONS

The Brandenburg Gate at Phantasialand

Solution to task 1:
Similarities in the columns, the decorative forms (triglyphs), the relief and the annexe pediment.

Solution to task 2:
Similarities in the overall impression: clarity, serenity, clearly defined structure.

Solution to task 3:
Precision, clarity, serenity, harmony, size, proportion.

Solution to task 4:
The use of architectural elements from ancient Greek temples gives the (otherwise purely functional) city gate an elevated, spiritual, almost religious status and triggers emotions such as awe and respect.

Buildings in Old Berlin

Solution to task 1:
Decorative, ornamented, adorned, dainty stucco forms, decorated gables, arched windows, complex façades. Instead of sleek and uniform, noticeable features are: decoration, embellishment, striking gables.

Solutions to task 2:
Picture 1: art nouveau ornamentation.
Picture 2: baroque-inspired gable windows and decorative forms.
Picture 3: façade construction (window + gable), return to classicism (+ balustrade).
Picture 4: baroque stylistic elements (volutes).
Picture 5: art nouveau façade.
Picture 6: art nouveau (floral ornamentation).
Picture 7: balustrade.
Picture 8: baroque ornament with cartouche.
Picture 10: classicism/Renaissance (Rocaille style).

The Brandenburg Gate – 200 years of German history reflected in a monument

Solutions to task 1:
Picture 1: text no. 2
Picture 2: text no. 4
Picture 3: text no. 7
Picture 4: text no. 1
Picture 5: text no. 3
Picture 6: text no. 6
Picture 7: text no. 5

Solutions to task 4:
Picture 1: (with pole) symbol of Prussia’s humiliating defeat.
Picture 2: (fall of the Wall) symbol of German reunification.
Picture 3: construction of the Wall symbol of the division of Germany.
Picture 4: (with quadriga and eagle): symbol of Prussian/German victory over France or symbol of the German national spirit.
Picture 5: (with red flag) symbol of war defeat.
Picture 6: (with torch procession) symbol of Nazi power.
Picture 7: (with king) no symbol yet, just a city gate.

Solution to task 5:
The Brandenburg Gate at Phantasialand resembles the real gate between 1814 and 1845 and at the present time (after the fall of the Berlin Wall).

The Wild West

Animal skins
TV
Jail
Cinema
Telegraph office
Public telephones
Rocky Mountains
Alps
Treks
Caravans
On slides made of wooden planks
With cranes
Shotguns
Automatic pistols
Silver City
Cow City

Estimating and calculating velocity

Solution to task 1:
There are 183 seconds in 3 minutes 3 seconds. So the average velocity is 1,280m : 183s = 6.99 m/s.

Solution to task 2:
L40m : 4x10 m/s +10 x 3.6 m / s = 36 m
So the car would have been going too fast in a 30 km/h zone.

Mystery Castle – acceleration

Solution to task 3:
(i) First the blood goes to the upper parts of the body, then to the lower parts when the pilot interrupts the dive.
(ii) In any vehicle (a car, a train etc.) you don’t follow the line of a bend directly, you maintain your original direction until the side of the seat or the wall forces you to go in the line of the bend. Passengers feel as if they’re moving against the bend. When a plane takes off, you’re pressed into your seat.

3D cinema – polarised light

Solution to task 1:
A double image is projected onto the screen.

Solution to task 5:
The grey heron can’t see the reflected light. It isn’t dazzled and it can see the fish more clearly.

All tasks without a solution on this page are to be freely discussed and debated.